

**STUDENTS' PERCEPTION ON THE USE OF CD-BASED STUDY
MATERIALS IN THE TEACHING AND LEARNING AT THE OPEN
UNIVERSITY OF TANZANIA**

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**DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION IN
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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation titled **an investigation of students' perception on the use of CD-based study materials in the process of teaching and learning at the Open University of Tanzania** in partial fulfillment of the requirements for the Degree of Masters of Open and Distance Learning of the Open University of Tanzania

.....
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.....
Date

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DECLARATION

I, **Hafidha Amrani Khatibu**, do hereby declare that this dissertation is my own original work and has not been submitted for a similar degree at any other University.

.....

Signature

.....

Date

DEDICATION

This work is dedicated to my beloved husband Mr. A.H. Kimaro, my daughter Nasra and my sons Abdulrazak and Abdulrahim.

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ABSTRACT

This study investigated on students' perception on the use of CD based study materials in the teaching and learning at OUT. Three research questions guided the study in focusing on students' perception on the use of CD-based study materials, students' access to computers as well as students' use of CD based study materials in the learning process. The study was conducted in Tanga, Katavi and Kinondoni regional centres and was guided by Technology Acceptance Model (TAM) developed by Davis in 1989. The study employed both qualitative and quantitative research approach applying a survey research design. Total respondents were 158 who included students, DRCs, RRMA and OUT ICT Technicians and were selected through purposive and convenience sampling techniques. Data were gathered through Questionnaires, interviews, focus group discussion and documentary reviews. Research findings revealed that majority of students have positive perceptions towards the use of CD based study materials in the teaching and learning process as they believed that this mode of delivery would definitely increase their creativity and interactivity and facilitate new knowledge. However, few respondents found it difficult to change their mind set from printed materials to softcopy materials due to various emerged challenges involving lack of access to computers, unreliable power supply as well as lack of prior knowledge and skills of interacting with e-learning materials. The study recommended that OUT should embark on the use of both hardcopy materials as well as soft copy materials (CDs) since not all learners had access to computers and skills in using computers. Furthermore, learners should be assisted in acquiring computers or laptops by loan or by finding low cost computers to overcome the problem of access of computers to students.

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LIST OF ABBREVIATIONS

AU	Athabasca University
CDs	Compact Discs
COL	Commonwealth of Learning
DRCs	Directors of Regional Centres
FASS	Faculty of Arts and Social Sciences
FBM	Faculty of Business Management
FED	Faculty of Education
FGDs	Focus Group Discussion
FLAW	Faculty of law
FSTES	Faculty of Science Technologies and Environmental Studies
ICE	Institute of Continuing Education
ICT	Information and Communication Technology
IEMT	Institute of Education Management and Technologies
IGNOU	Indira Gandhi National Open University
LAN	Local Area Network
LMS	Learning Management System
MU	Mzumbe University
NOUN	National Open University of Nigeria
ODL	Open and Distance Learning
OUA	Open Universities Australia
OUSL	Open University of Sri Lanka
OUT	Open University of Tanzania

PU	Perceived Usefulness
RRMA	Regional Record Management Assistants
SUA	Sokoine University of Agriculture
T/L	Teaching and Learning
UDSM	University of Dar es Salaam
UKOU	The Open University of United Kingdom
UNISA	University of South Africa

CHAPTER ONE

1.0 THE PROBLEM AND ITS CONTEXT

1.1 Introduction

This chapter provides an overview of the background, statement of the problem, the purpose and objectives of the study. It further identifies the research questions, significance of the study, definition of the key terms as well as limitations and delimitations of the study.

1.2 Background to the Study

Of recent, the role of Electronic learning (e-learning) technologies in teaching and learning in higher learning institutions has become of greater importance because of the use of information and communication technologies (ICTs) which is currently unavoidable for a quality and flexible learning. E-learning can be referred to as the design, development and delivery of instructional materials by electronic devices, such as computers, mobile, CDs and DVDs (Daniel and Mackintosh, 2009). The widespread use of electronic technologies and various applications provides incredible opportunities for the delivery of educational courses and training, and as such e-learning has now become a portable and flexible new method for learners to gain essential knowledge. Students having access to an e-learning system can now interact with instructional materials in various formats both online and offline anywhere and at any time (Bhuasiri et al, 2012: Okiki, 2011). This rapid development of information, communication and technologies (ICT) has, therefore, forced many higher learning institutions in developed and developing countries to

accept and implement the new technologies in their teaching and learning process.

Technological advancements have also led to significant changes in the way Open and Distance Learning (ODL) is being provided in the developed as well as developing countries. These technologies allow distance education institutions to provide instructional materials to students in geographically remote areas with increasing interactivity between students and teachers. Efficient delivery of such contents may be carried out through online technologies with the use of internet or offline technologies such as the use of Compact Disc (CDs), Digital Versatile Disc (DVDs), Satellite or Microwave links as well as fiber optics (Tagoe, 2012; Olaniyi, 2006). Various open universities in the world in addition to printed materials deliver their programmes through e-learning technologies including the use of CD based instructional materials.

In developed countries the use of TV, Videos, Computer and Compact Disc has been practiced as teaching devices to enhance and maximize the time for teaching and learning process (Carbonel, 2016). For example Indira Gandhi National Open University (IGNOU) and United Kingdom Open University (UKOU) continue to use print based materials as well as CDs and DVDs as a standard part of its model (Commonwealth of Learning report, 2016).

Similarly, in developing countries E-learning has become an important part of university education and is gaining applicability as an educational and training tool for a variety of reasons, including cost savings, institution reusability, and learner

flexibility (Shee and Wang, 2008). Universities such as National Open University of Nigeria (NOUN), Open University of Sri Lanka (OUSL), Athabasca University (AU, Canada), Zimbabwe Open University (ZOU) and the Open University of Tanzania (OUT) use a range of delivery modes including printed materials, CDs and DVDs (Commonwealth of Learning report, 2016: Kaputa and Mpezeni, 2016: Kambira, 2011). The use of CDs is important as information or knowledge storage for teaching materials because it can accommodate any form of presentation and lesson demonstrations like videos, power point and others (Carbonel, 2016).

1.2.1 The Situation of E-Learning at the Open University of Tanzania

The Open University of Tanzania (OUT) is an institution that offers certificates, diplomas, degrees and postgraduate programmes through various means of communication such as broadcasting, telecasting, Information and Communication Technologies (ICT), correspondence, enhanced face to face, seminars, contact programmes or the combination of any two or more of such means (OUT, 2014). OUT has a student population of over 44,000 spread in twenty nine Regional Centres, and eight coordination centres spread throughout the United Republic of Tanzania and beyond (OUT, 2014).

E-Learning adoption at the Open University of Tanzania started way back in 2006/2007 where the customization and initial use of the Learning Management System (LMS) started, in this case the system was A-tutor (Mnyanyi & Mbwette, 2009). A year later, the university moved and customized Moodle Learning

Management System (which is an open source system) due to availability of more technical support as many other institutions were using the same system (Ibid).

In 2009, the OUT articulated a clear vision in its ICT policy document where ICT would be integrated into teaching, learning and research and drives most of the university's administration services, such that teachers/researchers use ICT as a basic tool to teach, communicate and collaborate with students, peers, and researchers within and outside the university (OUT, 2009). As a result of the ICT policy, OUT declared extensive integration of Compact Disc Read-Only Memory (CD-ROM)-based study materials as a strategy to address the challenges of print-based study materials effective from 2009/2010 academic year (OUT 2009). It was anticipated that integration of CD-based study materials will address the challenges associated with over dependence on print-based study materials (Mbvette, 2012; Nihuka, 2011). In meeting this goal, the Information Resource Management Department (IRMD) was successfully established with six sections one of which is an E-learning Development and Multimedia Section (EDMS). The unit is responsible for promotion of the use of E-learning in current and future programmes of the University as well as in the production and distribution of CDs/DVDs to students. Thus, effective from 2009 no hard copy study materials were produced and distributed to OUT students and instead soft copy study materials in interactive CDs are now used (OUT, 2009). The CDs for various courses offered by the university are produced and distributed to all regional centers for students to access and use in their learning process.

Although there is a number of electronic technologies that are used in facilitating learning in ODL delivery, interactive Compact Disc (CDs) is the dominant technology used at the OUT. As the evolution of this technology presented a substantial shift in the provision of course resources (previously print-based), it was seen as critical to understand how the students perceived these resources, hence the articulation of the study problem.

1.3 Statement of the Problem

The Open University of Tanzania since its inception in 1992 has been using printed study materials as a dominant mode of course delivery like the case in most open and distance learning universities in Africa and elsewhere in the world. With the advancement of ICT, OUT has shifted its mode of course delivery from print-based materials to soft copy materials as the core mode of course delivery in all of its courses (OUT, 2009). Hence, from 2009 the University introduced the use of study materials on compact discs (CDs) format to its learners in its faculties and institutes (OUT, 2009). This transformation was due to the reason that the earlier approach was associated with several challenges including costs in the production and distribution process, delays in delivery of study materials to students, outdated study materials and failure to incorporate changes after printing (Mnyanyi & Mbawette, 2009 as cited in Nihuka, 2011). Kaputa and Mpezeni (2016) posit that the printing component tends to be most expensive and the use of CDs significantly cut costs.

According to Kaputa and Mpezeni (2016), there have been students' complaints on the use of CD-based materials due to the reasons that students have been used to

hardcopy materials and that some students considered the introduction of CD modules as the means of course delivery to be the end of their dream to become graduates. Given the situation in the country where majority of the OUT students are scattered far and wide in remote rural areas where accessibility of computers and power is a major challenge, this evolution seemed to cause challenges to students (URT, 2003; Bakari, 2009).

Several studies have been conducted in Tanzania, OUT in particular on the use of e-learning technologies in general and not its components. For example, Nihuka (2011) conducted a research on collaborative course design to support implementation of e-learning by instructors at OUT; Nyandara (2012) conducted a study on the challenges and opportunities of technology based instruction in Open and Distance Learning (ODL) institutions particularly at the Open University of Tanzania (OUT) and Center for Continuing and Distance Education (CCDE -China) and Mnyanyi, Mbwette and Bakari, (2009) investigated on the implementing E-learning in higher open and distance learning institutions in developing countries: the experience of the Open University of Tanzania.

Apparently, no study has been done at OUT to specifically determine perceptions of students towards the use of CD-based study materials in the teaching and learning process. Given this fact the study was set out to investigate into students' perception on the use of CD-based study materials in the teaching and learning process with a specific focus at the Open University of Tanzania.

1.4 Purpose and Objectives of the Study

The central purpose of this study was to assess perception of students on the use of CD-based study materials in teaching and learning at the Open University of Tanzania. Specifically, the study sought to achieve the following objectives.

- i) To explore students' perception on the use of CD-based study materials in the teaching and learning process at OUT
- ii) To determine the extent to which access to computers may affect the use of CD based study materials in the learning process at OUT
- iii) To examine students' use of CD based study materials in the learning process at OUT

1.5 Research Questions

The following research questions were used to guide the collection of data for this study.

- i) What is the perception of OUT students towards the use of CD-Based study materials in the teaching and learning process?
- ii) To what extent does access to computers affect the use of CD based study materials at OUT?
- iii) To what extent do OUT students use CD based study materials in the learning process at OUT?

1.6 Significance of the Study

The findings of this study would give rise to recommendations and suggestions to policy makers and other educational stakeholders in planning and implementing

several strategies for effective use of CD-based study materials in Open and Distance Learning institutions. The study would also help open and distance learning institutions to design better strategies of providing education resources to distance learners through CD-Based mode of delivery and ultimately improve the level of access and use. Furthermore, the study would be a basis for further empirical evidence related to CD-Based study materials in open and distance learning settings.

1.7 Definitions of Key Terms

For the purpose of clarity and consistency, the following terms which are used frequently in this study are given operational definitions as follows.

CD-ROMs: Short for Compact Disc-Read Only Memory. It is a compact disc used as a read-only optical memory device for a computer system. CD-ROM is used with a computer (rather than with an audio system) to store a large amount of digital information that can be accessed but cannot be altered by the user

Compact Disc-CDs: A compact disc is an optical storage medium that can store over 500 megabytes of information. The disc is 120 mm in diameter with a 15 mm hole in its center.

CD-based study materials: In the context of this study, CD-based study materials refer to the instructional learning materials that are in the form of soft copy distributed to the learners in all OUT regional centers.

Printed study materials: refer to the instructional learning materials that are in the form of hard copy distributed to the learners in all OUT regional centers.

E-learning: E-learning can be referred to as the design, development and delivery of instructional materials by electronic devices, such as computers, mobile, CDs and DVDs (Daniel and Mackintosh, 2009). In the context of this study, e-learning means *the* use of CD-ROM study materials as an educational delivery mode.

1.8 Limitations of the Study

Although the research has reached its aim, there were some unavoidable limitations. First OUT students are not found in a confined area compared to other conventional universities. So it was difficult to get the expected sample at once. However, with the help of the Regional Directors the researcher managed to collect the questionnaires of 150 respondents out of 200. Furthermore, as it was approaching the annual examinations students were busy, so they did not fill the questionnaires on time. As a result data collection and analysis were delayed. However, the problem was solved by extending the projected time for completion of the study. The obtained data enabled the researcher to put forward relevant conclusions.

1.9 Delimitation of the Study

The study solely focused on the perception of OUT students in using CD-Based study materials in the learning process. It did not include the use of other electronic technologies that may be employed by the OUT in the students learning process. The study also focused on only OUT non postgraduate (undergraduate and non-degree)

students and not the postgraduate students. Furthermore the study was conducted in Kinondoni, Katavi and Tanga regional centres of the Open University of Tanzania out of 29 regional centres. For this reason the findings and conclusions of the study are delimited only to the category of students within the mentioned study areas.

1.10 Organization of the Study

This study is organized into five chapters. Chapter one deals with the problem which informs the study and its context, thus providing the justification for the study. Chapter two provides literature review related to the study whereas chapter three describes the methodology applied in the study. Findings of the study are presented and analyzed in chapter four. Lastly, the summary, conclusions and recommendations are presented in chapter five.

1.11 Summary

Chapter one introduced the study by providing a background to the problem, statement of the problem, purpose and objectives of the study, significance of the study, research questions, limitations and delimitation of the study, definitions of the key terms and lastly organization of the study. The next chapter presents the literature review.

CHAPTER TWO

2.0 REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents a review of literature related to the study. The review is guided by Technology Acceptance Model (TAM) that explores the acceptance of technology and empirical studies within and beyond Tanzania. The study covers various items based on the research questions and objectives including advantages of using CD-based study materials in the learning process, learners' access to technology, technology use and skills in using CD-based study materials as well as the challenges encountered by students with the use of CD-Based study materials.

2.2 Theoretical Framework Underpinning the Study

Technology Acceptance theories are commonly used in many studies that investigate people's acceptance on the use of e-learning technologies. Several theories such as Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) have been developed to explain users' perception on the use of technology. Students' perception of e-learning in university education may be influenced by several variables. Keller and Cernerud (2002) have identified variables such as age, gender, previous experience of computers, technology acceptance and individual learning styles as major predictive factors when discussing acceptance of technology by students. This study employed Technology Acceptance Model (TAM) developed by Davis in 1989 in exploring students' perception on the use of CD-based study

materials in the teaching and learning at the open university of Tanzania. The adopted model is discussed with a view to underpinning the framework of the study.

2.2.1 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) was developed by Davis in 1989. Tam was built upon Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) which posits that beliefs could influence attitudes which lead to intention to use and finally actual usage behavior. TAM as proposed by Davis describes that a person's behavioural intention to use e-learning is determined by perceived usefulness and perceived ease of use (Mahdizadeh, Biemans & Mulder, 2008).

TAM's main constructs are perceived usefulness and perceived ease of use. Perceived Usefulness (PU) reflects the level to which an individual believes that using a new system would improve the task performance (Pituch and Lee, 2006, Saade, Nebebe & Tan, 2007 and Venkatesh & Davis, 2000). In the current study, PU involves developing confidence in using computers to access materials from the CDs, helping understanding of course materials, easily access of CD based study materials, increased chances of passing a course, easy to carry and store, improved teaching and learning and exposure to new knowledge and learning experience as related to use of computers and CDs. On the other hand perceived ease of use shows the degree of belief that a new system does not require much effort to run (Pituch & Lee, 2006, Saade, Nebebe & Tan 2007) and Venkatesh & Davis, (2000). In this study perceived ease of use include knowledge and skills in using computers to access CD based study materials and experience in using computers. According to Venkatesh

and Davis (2000), perceived usefulness and perceived ease of use are the most influential variables in determining individuals' attitude towards the tested technology. Furthermore, in the current study, attitude can be favorable or unfavorable towards the use of CD based study materials. Following this attitude behaviour intention to use the CD based study materials or not is also developed (see Figure 2.1).

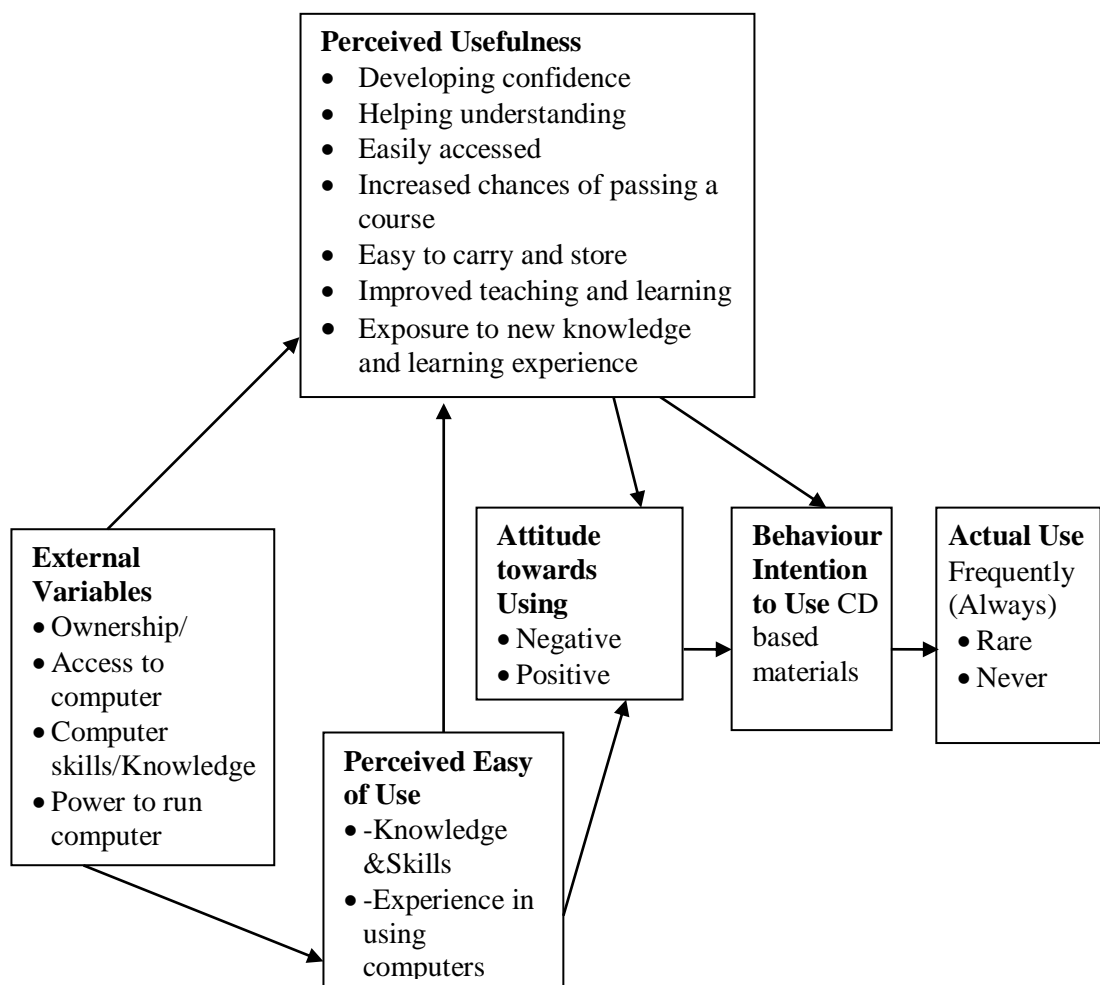


Figure 2.1: Theoretical Model of the Study on Students' Perception on the Use of CD Based Study Materials in T/L at OUT As Modified from TAM by Fred Davis (1989)

Source: Researcher 2016.

In this study, however, predictive variables such as ownership or access to computer, knowledge and skills of students to use computer in accessing materials from the CDs in the learning process as well as power to run computer were however, particularly true in identifying perceived usefulness and perceived ease of use from the study area. These variables have been described by most writers on TAM as external variables that can be associated with high knowledge in CD based study materials mode of delivery observed.

Although TAM's ultimate goal is actual usage, it could also be used to explain why individuals may accept or not accept a particular technology such as e-learning (Jung et al., 2008). This model has been chosen for this study as it offers the basic outlines of an individual's view or reaction towards a technology. Students perception on the use of CD based study materials at OUT is in line with this theory.

2.3 Benefits and Challenges of CD based Study Materials

A compact disc (abbreviated as CD) is a small, portable, round medium made of molded polymer (close in size to the floppy disk) for electronically recording, storing, and playing back audio, video, text, and other information in digital form. CD was originally developed as a format to store audio information in an optical disc format developed by Sony and Philips in 1979. CDs were first released in Japan, and by March of 1983 the discs had made their way to the US and Europe and were later on spread in many parts of the world.

The use of educational technologies such as CDs has benefits to students who are affected by the challenges of print-based materials. According to Lynch (2014),

when ODL students use CD-based study materials as complementary to other learning resources they enhance their access to various resources, learning becomes fun and increases understanding of concepts. Furthermore, he asserted that the use of CDs is such an amazing form of learning technology for students who need a way to learning technology which is different and more flexible.

According to Lynch (2014), a CD-based study material that incorporates features (i.e. text, sound and pictures) is quite effective in facilitating interaction between students and the study materials. Through the use of CDs learners have the option to study from the CD or printed material depending on their preferred learning styles (Kaputa & Mpezeni, 2016). According to Smedley (2010), the adoption of e-learning provides the institutions as well as their students or learners with much flexibility of time and place of delivery of learning information.

Similarly, Vengesayi (2009) asserted that CDs have benefits to the learner as they help them to acquire a lifelong skill of being computer literate using the computer which is a useful tool. Materials in the CDs are more interesting than printed material because the content being presented is to the point, with important points being listed on screen, giving access to extra information separately (Lynch, 2014). CDs materials increase interaction with the content. Instead of reading lengthy paragraphs, you are presented with small chunks of content, ensuring student interaction, alertness and, thus, increased understanding and retention (Lynch, 2014). It is flexible when issues of time and place are taken into consideration.

Despite the benefits that e-learning has when adopted in education, it also has some

disadvantages. According to Amaride and Balarinwa (2010), the major constraints hindering the use of electronic resources include poor power supply, poor infrastructure, lack of adequate skill, high cost, and unavailability. Hoven (2000), Phillips (2005) and Smart and Cappel (2006) add on this by indicating that the challenges encountered by both instructors and students in using new technologies is limited competence, beliefs about teaching and learning and skills and experiences on some e-learning technologies such as computer. In order to redress such challenges Joint (2003) pointed out that intensive training on computer use and on e-learning applications must be provided so as to promote positive beliefs among students and instructors regarding the role of technologies in education

2.4 Students' Perception on the Use of CD-Based Study Materials in the Teaching and Learning Process

Student perceptions are a very important way to determine how a newly imposed technology may be received. The introduction of CD-based study materials to most ODL institutions today has been considered as a necessary mode of course delivery that was employed to address the challenges of print based study materials. However, there are very few studies on students' perceptions done in Africa regarding the use of CD based materials (Kionywaki, 2011). Most studies have clearly focused on students' perceptions on the whole e-learning as a mode of delivery (Chikasha et al., 2006,) and not its components (Kaputa & Mpezeni, 2016).

Student perception and attitudes towards e-learning have been identified as critical to the success of e-learning (Zhang, 2012). According to Rahamat et al (2011),

university students in developing countries have varying perception towards e-learning but generally their attitudes are positive. These positive attitudes towards e-learning are associated with positive impact on student motivation, self-esteem as well as the recognition that e-learning would help them improve their learning effectiveness and efficiency (Nassoura, 2012, Rahamat et al 2012).

Aixia and Wang (2011) assert that student attitudes are influenced by the quality and perceived ease of use of e-learning courses, functionality of e-learning platforms, and the level of student computer skills. This is further supported by Liaw and Huang (2011) who asserted that students computer experience which include perceived self-efficacy, enjoyment, and usefulness of e-learning technologies plays a role in determining their perception towards the use of technology and these are significant to their e-learning readiness and acceptance (Selim, 2007). Chen and Huang (2012) stated that e-learning system functions can be expanded by understanding student attitudes and meeting their needs, which then would increase the impact of learning and enhance satisfaction with the learning process.

Improvement of technology infrastructure in ODL institutions is very critical in order to allow students and instructors to access e-learning resources effectively. According to Mbwette (2008) and Bakari (2009), students are quite positive and receptive about ICT related innovations in education. A CD-based study material thus, is one among the strategies of improving course delivery in ODL in most of universities in Sub-Sahara Africa including Tanzania (Mbwette, 2008).

2.5 Students' Access to Electronic Devices

Student level of access to electronic devices such as computers and laptops is a primary factor that would determine their attitudes towards the use of e-learning technologies (Rhema and Miliszewska, 2014). The availability of reliable ICTs and the convenience of accessing these technologies reflect student attitudes toward e-learning. Access to the necessary ICT infrastructure is one of the most important issues that come into focus in the assessment of how developing countries have progressed in e-learning (Mbwette, 2008). According to Gulati (2008), the developing nations find the traditional means of learning more reliable and sustainable.

Sweeney and Geer (2010) in Libya found that limited access to ICT constrains student capabilities, attitudes and experiences. According to Hussain (2007), students selected for a study on e-learning in Pakistan indicated that they faced many difficulties in accessing ICT facilities and this limited their ability to use technologies. A large number of students had to rely on a very limited number of cafes to access the Internet for their learning needs. Thus, in general, accessibility of technology tends to affect student and instructor attitudes and competencies and correlates positively with the level of technology use (Rhema and Miliszewska, 2014).

According to the literature, the level of access to technology and its reliability influence student intentions to use ICTs to support learning (Papaioannou & Charalambous, 2011, Sweeney & Geer, 2010). Rhema and Miliszewska (2014)

contended that there was a statistically significant correlation between student attitudes toward technology and their levels of access to various technologies. Students who had better access to technology and the Internet generated stronger positive attitudes.

2.6 Technology Use, Knowledge and Skills

Skills in using electronic devices are important in determining one's perception in using CD based study materials. The skills required to maximize the potential of electronic resources are much greater than those required for searching printed materials (Dutton, 1990). Over the last few decades there has been increased use of computing devices in educational institutions in developing countries (Trucano, Hawkins & Iglesias, 2012). The use of the web, computer, and mobile-based technologies has drawn a lot of interest among students, who use them for educational purposes as well as for social networking. This at least implies a degree of familiarity with these technologies and the skills for using those (Trucano et al., 2012). However, students' ability to use ICTs is significantly hindered by the low level of technology access and use (Hussain 2007).

Many research studies identified correlations between positive computer experience and positive attitudes, competence and comfort with computers (Papaioannou & Charalambous, 2011). However, other studies claimed that computer experience did not play a significant role in reducing computer anxiety or developing positive computer or e-learning attitudes (Olatoye, 2009). According to Tagoe (2012), acceptance of e-learning depends on three critical factors that are, computer

ownership, prior experience and perception of students about e-learning. Thus, when using e-learning technology in the teaching and learning process we should be primarily focused on the educational value of the tools and their applications, their adequacy in the acquisition of knowledge and the interaction between users and the tools when using them.

2.7 Empirical Studies on Perception of Students towards E-Learning Technologies

Kaputa and Mpezeni (2016) conducted a study on perceptions of open and distance learners towards modules on CDs, the Zimbabwe Open University experience. The findings of the study revealed that most learners had problems in using the CDs due to lack of access to computers and computer skills. It was demonstrated that some students did not even have the basic skills to install the acrobat reader needed to be able to read the CD once it was in the computer despite having done the initial computer courses offered by the university. Thus, it was observed that the learners who had computers or had access to them tended to be more favorable to the CDs than those who did not.

Carbonel (2016) conducted a research on CD Based Instructional Materials in Teaching Statistics at Kalinga Apayao State College. The study endeavored to experiment the use of a CD based instructional material in teaching Statistics in the graduate level of education. The study determined the perceived extent of need by the respondents on the use of a CD based instructional material in Statistics and determined the preferences and attitude of the respondents on the use of CD based

instructional materials in teaching Statistics. The findings of the study revealed that the use of CD based instructional materials in Statistics was “much needed”, “much preferred and was effective in teaching Statistics.

Similarly, Rhema and Miliszewska (2014) conducted a study involving analysis of student attitudes towards e-learning with a focus on engineering students in Libya. The findings of the study demonstrated that there was a statistically significant correlation between student attitudes toward technology and their levels of access to various technologies. Students who had better access to technology and the Internet generated stronger positive attitudes than those students with no access to technology.

Another study was done by Adewole-Odeshi (2014) who investigated on the attitude of students towards e-learning in South-West Nigerian Universities. The findings showed that students had a positive attitude towards e-learning because they found the system easy to use and useful for their course work and therefore they had the intention to use an e-learning system. Further, the study revealed that there is no significant relationship between level of computer experience and students’ intention to use an e-learning system.

Tagoe (2012) conducted a study on students’ perceptions on incorporating e-learning into teaching and learning at the University of Ghana. The findings of the study indicated that acceptance of e-learning depends on three critical factors which are computer ownership, prior experience and perception of students about e-learning.

With respect to computer ownership, the study found out that access to computers was quite high among students. It was further revealed that computer skills of students have improved because most students have acquired the skills before entering the university and for those who did not have these skills, the university, friends and family members provided opportunities for these students to acquire computer skills.

Nihuka (2011) conducted a research on collaborative course design to support implementation of e-learning by instructors. The study sought to understand instructors' and students' access to e-learning technologies, their perceptions on e-learning implementation at OUT, their competences and the implications for collaborative course design in design teams and e-learning implementation at the Open University of Tanzania. The findings of the study revealed that instructors and students alike are positive to use e-learning technologies in course delivery.

A study by Ray and Day (1998) on Student Attitudes Towards Electronic Information Resources has revealed that students' opinion towards the use of electronic resources, in particular CD-ROM, has been positive, with students enjoying using these sources as they found it relatively easy to use and saved them time.

2.8 Research Gap

From studies done in Tanzania and Africa, it becomes evident that most of the studies have tended to focus on students' perception and intention to use e-learning

technology in general. Apparently, there is limited comprehensive study that has been specifically done regarding the use of CD-based study materials as one of the e-learning technologies used in the teaching and learning of distance learners. This study therefore was intended to fill the emerging research gap by investigating on perception of students on the use of CD-Based study materials in the teaching and learning at the Open University of Tanzania. Chapter Three presents the research methodology.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the methodological procedures in gathering information relevant to the study were described. The chapter offers an account of the research design and paradigm, target population, sample and sampling techniques. It also illustrates data gathering methods and instruments that were used in collecting data, validation of research instruments as well as data analysis procedures.

3.2 The Research Design

A research design is a plan showing the approach and strategy of investigation aimed at obtaining relevant data, which fulfill the research objectives and the research questions (Cohen and Marnion, 2000). A design structures the research, showing how all of the major parts of the research project work together to try to address the central research question (Kombo & Tromp, 2006). In this respect, the study principally employed survey research design.

The survey research design describes systematically a situation, phenomenon, or area of interest factually and accurately (Omari, 2011). According to Creswell (2012), this is a useful design to use when researchers seek to collect data quickly and economically, study attitudes and opinions, and survey geographically dispersed individuals. The researcher therefore, decided to use this design because of its

capability in obtaining information from large samples of the population and its effectiveness in data collection with the lower cost.

3.3 Research Approach

This study was guided by mixed methods approach whereby both qualitative and quantitative research approaches were used. According to Jacobs and Sorensen (2010), qualitative research approach considers collecting information from the participants in order to understand the phenomenon under the study from the perspectives of those involved in the research. This study, therefore, used this research approach in order to have a detailed account of students' perception towards the use of CD based study materials. On the other hand, quantitative research approach was used in collecting data on the extent to which learners accessed computers and uses of CD based study materials. According to Creswell (2012), quantitative research identifies a research problem based on trends in the field or on the need to explain why something occurs.

3.4 Study Area

The study was conducted in three OUT regional centers, namely Kinondoni, Katavi and Tanga out of twenty nine regional centers. The three regional centres were selected purposely in order to allow the researcher to obtain representation from different parts of Tanzania. Kinondoni was selected to represent the urban environment where the information infrastructure is relatively well developed as compared to other centres. Furthermore, Kinondoni regional centre is one among the giant centres to admit students. According to OUT Facts and Figures 2011/2015,

Kinondoni had the highest cumulative enrollment followed by Arusha regional centre (OUT, 2015). This being the fact, the study assumed that the big number of students represented different categories of students with different perception on the use of CD based study materials.

On the other hand Tanga which is located at the Northern zone of Tanzania was selected to represent moderate centers to admit students while Katavi regional centre located at the Western zone of Tanzania represents the centers with low enrollment (OUT, 2015). The three centres were chosen with an assumption that the students from these differently located centers may differ in their technology know-how, affordability of computers, use of technology and the level of ICT infrastructure which are important factors in determining level of perception and acceptance toward CD based study materials. The discovery of such factors could assist in making reliable and conclusive statements related to students' perception and actual use of CD based study materials mode of delivery.

3.5 The Target Population

Population refers to the entire group of people, firms, plants or things that the researcher wishes to investigate, which have one characteristic or more in common that are of interest to researcher (Best and Kahn, 1998). Ogula (2010) defines a population as any group of institutions, people or objects that have at least one characteristic in common. For the present study, the population from which the researcher drew conclusions comprised of all students and staff of the Open University of Tanzania while target population involved non postgraduate

(undergraduate and non degree) students from the three selected regional centers, administrators from the regional centers and ICT personnel from OUT headquarters. Their choice was based on the fact that each category is engaged and implicated in the study in different ways.

3.6 Sample and Sampling Techniques

3.6.1 Sample of the Study

Sample is a finite part of a statistical population whose properties are studied to gain information about the whole. Patton (2010) and Creswell (2009) view sample as a small population selected for observation and analysis. For possible access and manageability, the total sample of 158 respondents were involved. These comprised of 80, 40 and 30 (non postgraduate) students from Kinondoni, Tanga and Katavi regional centers respectively; 3 Directors of Regional Centers (DRCs) one from each of selected centers; 3 Regional Records Management Assistants (RRMA) one from each selected regional centre and 2 ICT technicians from OUT headquarters. Table 3.1 briefly presents sample composition of respondents who were involved in this study.

Table 3.1: Composition of the Sample

Categories of Respondents	Expected	Actual Respondents		Total
		M	F	
Students (Kinondoni)	100	41	39	80
Students (Tanga)	50	21	19	40
Students (Katavi)	50	20	10	30
Directors of regional centres	03	02	01	03
Librarians of regional centres/RRMA	03	02	01	03
ICT technicians (HQ)	03	01	01	02
Total	209	87	71	158

Source: Researcher 2016

3.6.2 Sampling techniques

Sampling technique is a procedure used to select some elements of a population in such a way that it represents actual characteristics of the total population (Cohen *et al.*, 2000). Sampling can be done through different techniques. This study employed non-probability techniques through convenience and purposive sampling to select area of study as well as respondents.

3.6.2.1 Convenience Sampling Technique

Convenience sampling is a type of nonrandom sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study (Dörnyei, 2007). Similarly, Kalton (1983) defines convenience sampling as a sample in which elements have been selected from the target population on the basis of their accessibility or convenience to the researcher. Convenience sampling involves the sample being drawn from that part of the population which is close to hand. That is, a population is selected because it is readily available and convenient. In this study, convenience sampling was used to obtain 150 OUT students from sampled regional centers. The technique was used to select students because OUT students are homogeneous and are not confined in one area. Getting them depended on their convenient accessibility and availability to the centre.

3.6.2.2 Purposive Sampling Technique

Purposive sampling is a deliberate selection of particular units of the universe for

constituting a sample on the basis that the small mass that they so select out of huge one will be typically or representative of the whole (Kothari, 2004). Purposive sampling procedure was used in obtaining key informants such as directors of regional centers, regional records management assistants and ICT technicians because they were considered by the researcher to be more knowledgeable about the use of CD based study materials of the study areas. In this study, the regional directors played a double role as the administrators and as academic staff who were assumed to have enough understanding of the students' perception towards the use of CD based study materials. The representatives were selected purposely because they were seen as instances that were likely to produce the most valuable data (Denscombe, 2007).

3.7 Data Gathering Methods

Data from this study were obtained from both primary and secondary sources. Secondary data were obtained from the articles in journals (Published documents from the regional centres, the OUT main library and internets). Through documentary review, the number of courses offered through CDs, number of CDs required in each faculty, number of CDs distributed to students as well as available CDs were documented. Primary data were collected through questionnaires, interviews and focus group discussions. The questionnaire survey method involved OUT students, interviews involved DRCs, RRMA and ICT technicians while focus group discussions involved students of the three regional centres. The questionnaire survey was used to collect quantitative data while interview and focus group discussion were used for collection of qualitative data.

3.7.1 Questionnaire

According to Kombo (2006), questionnaires are widely used to obtain information about current conditions and practices and to make inquiries concerning attitudes and opinions quickly in the precise form. Both open-ended and closed-ended questions were self-administered to 150 OUT students in order to capture both qualitative and quantitative information relevant for the study (Appendix A). Closed-ended questions were administered to respondents as they were found to be effective in keeping respondents close to the subject of study due to their objectivity nature. A five point Likert Scale with Strongly agree, Agree, Neither agree nor disagree, Disagree and Strongly disagree and other closed-ended questions were used from main items. Furthermore, Open-ended questions were asked in order to seek students' views on the use of CD based study materials. This technique was chosen as it was found to have the ability to collect a lot of information from large number of respondents within a short period of time (Kothari, 2004).

3.7.2 Interview

Interview as portrayed by Denscombe (1998) is a two-person conversation initiated by the interviewer with a clear list of issues to be addressed and questions to be answered. The technique enables the researcher to establish rapport with potential participants thereby gaining their cooperation. In this particular study, semi-structured interviews were administered to OUT directors of regional centres, regional record management assistants and ICT technicians to elicit detailed information needed for the study. It was a face to face conversation between interviewer and interviewee (See Appendix B). Consultation to the key informants

was made one week before, so as to avoid inconveniences that may interfere discussion. The interview guide questions were used to each interviewee during interview session. The technique was chosen so as to provide a chance to find out what is in and in someone else's mind, like feelings, perceptions and intentions (Patton, 1990).

3.7.3 Focus Group Discussion

Patton (1997) points out that FGD is held with a small group of six to eight people who are encouraged to talk about the subject of interest. During discussion, the researcher poses an issue and keeps on probing and hence making the ball rolling enabling him or her to elicit significant information about the study. In this study, FGDs were conducted with students only. Six students in each centre studied were conveniently sampled from those who had filled the questionnaires in order that they participate in FDG. FGD guidelines were used to ensure thorough coverage of the relevant issues. The method was used to collect qualitative data from the study area, involving perception of OUT students in using CD based study materials and accessibility of computers that enhance its actual use (See Appendix C). The participants confirmed to join FDGs at their centre premises three days before so as to avoid inconveniences that could affect the discussion. The chosen sample provided clear information on the actual use of CD based study materials. The researcher commenced the discussion by obtaining oral consent from the participants. The participants' consents were obtained after providing clear statements that assured the confidentiality of the discussed information. After obtaining consent, the researcher requested the participants to introduce themselves

and then introduce the topic for discussion. The discussion was in English language under the control of the researcher who recorded all important points that emerged by using note book. The sessions lasted within one hour.

3.7.4 Documentary review

Documentary review involves the process of going through different types of documents so as to get useful information for the study. Denscombe (1998) asserts that documentary review is cost effective with the advantage of providing a vast amount of permanent and cross-checkable information. The study reviewed secondary sources on perception of students on the use of CD based study materials in the teaching and learning. Documents like dissertations, published and unpublished thesis, books, reports, newspapers, journal articles, pamphlets, brochures and resources retrieved from the internet were consulted. Furthermore, the method was used in gathering information on number of courses offered through CDs, number of required CDs from each faculty for each sampled centre together with number of CDs available and in shortage.

3.8 Validity and Reliability of Research Instruments

Validity is defined as the degree to which a test measures what is supposed to measure (Gar, 2002). Validity of the data is important to guarantee the study findings measured accurately by the instruments used. The validity of this study was assured through proper identification of research problem and the use of different research methods of data collection such as questionnaire survey, interview, focus group discussion and documentary review. The researcher therefore used multiple

techniques in which one instrument complemented the others. In addition to that, prior to the field work, the instruments were reviewed by other colleagues (OUT staff cum ODL programme students) from Faculty of Education and the researcher's supervisor who gave their suggestions and recommendations that were accommodated to amend and refine the instruments

On the other hand, reliability is the degree to which test consistently measures whatever it measures (Mugenda, 2003). Reliability was established through pre testing method during pilot study. Five students from Tanga regional centre were conveniently selected for pilot testing the questionnaires. Reliability was further maintained by ensuring the use of appropriate sampling techniques which were convenience sampling and purposive sampling and different methods in data collection.

3.9 Data Processing and Analysis

Data analysis is a process that implies editing, coding, classification and tabulation of collected data (Kothari, 2004). Data analysis was done in accordance to the research questions of the study. In this study data obtained from the use of questionnaires were edited and assigned serial numbers for the purpose of easy identification during the coding process and rechecking of information on the questionnaires during data entering exercises. Then computer software Statistical Package for the Social Sciences (SPSS) 20th version was used in analyzing quantitative data. Descriptive data analysis such as frequencies, percentages and graphic tables were applied to describe the variable characteristics emanated from OUT students' survey. On the

other hand, content analysis was employed in interpreting qualitative data drawn from interviews, documentary review and focus group discussion. All relevant information and data addressing a particular research question were pulled together, subdivided into coherent categories in search of the main themes and in an attempt to quantify the data where necessary. Some of the responses or explanations by respondents have been presented as quotations.

3.10 Ethical Consideration

Creswell (2012) asserts that in all steps of the research process, you need to engage in ethical practices. Cohen, Mannion, & Morrison, Morrison (2000) stipulates that ethical principles in the conduct of research include acquiring research clearance and the informed consent of the participants as well as maintaining confidentiality. This study considered effectively the human rights, national policies and personalities embodied in people's values. The respondents were assured of the confidentiality of the information they provide and that the results of the study were to be used for research purposes only. The research instruments were designed to avoid embarrassing questions through pre-testing of the questionnaire during the pilot study. Furthermore, the researcher acquired a clearance for data collection by getting a letter from the Open University that enabled the researcher to obtain permission from responsible institutional authorities. Omari (2011) asserts that, research is supposed to be a clean sophisticated business and it should be conducted with the highest standards of moral and ethical considerations, for that matter the researcher highly observed the code of conduct for research ethics and avoided ethical misconducts in the research enterprise.

CHAPTER FOUR

4.0 DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents, analyzes and discusses the findings of the study on students' perception on the use of CD based study materials in the teaching and learning process at OUT. Data were obtained through questionnaires, interviews, focus group discussion and documentary review. The presentation follows three objectives and research questions that guided the study. The chapter is organized into four sections, namely demographic characteristics of the study areas, students' perception on the use of CD-based study materials, students' access to computers as well as students' use of CD based study materials in the learning process. The discussion, on the other hand, was made on the reflection of the theoretical and empirical perspective as presented in chapter two of this study.

4.2 Demographic Characteristics of the Students

Students' characteristics are normally regarded as important factors in assessing the introduction of e-learning technologies in the teaching and learning process. A number of demographic characteristics of students which had contributions to this study were critically looked upon and their findings presented. Students' age, gender, educational background and faculty were among the characteristics involved. The study findings were obtained from one hundred and fifty (150) OUT students from three regional centres namely Tanga, Katavi and Kinondoni. Data were collected from questionnaires, focus group discussion, interviews and documentary review.

4.2.1 Age of the Respondents

In open and distance learning, age is an important component in determining one's readiness to learn. In this study, respondents were required to indicate their age and the responses were as follows.

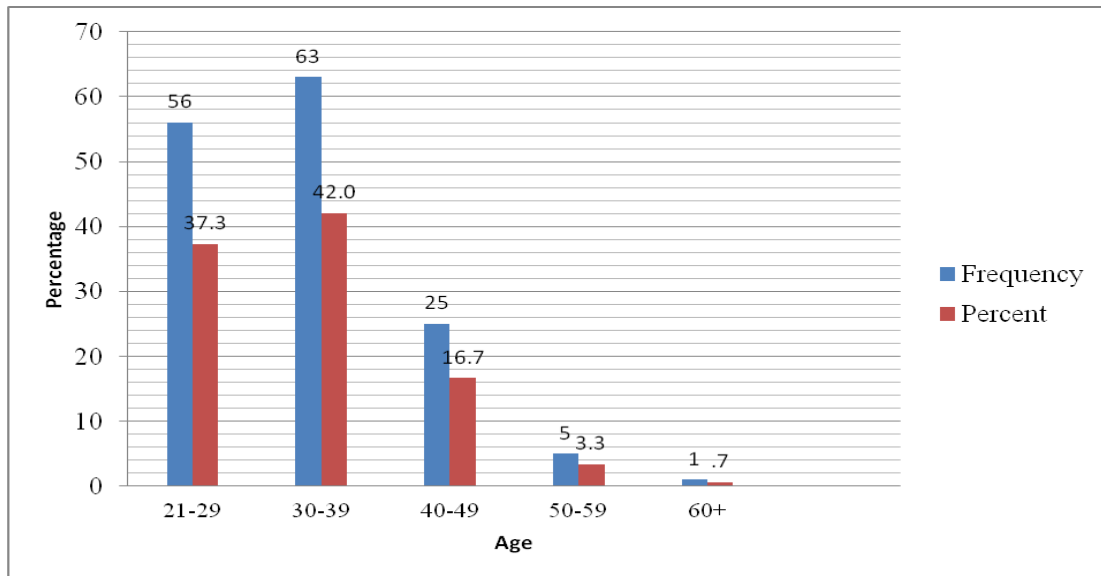


Figure 4.1: Age of the Respondents

Source: Field data, 2016

The findings from Figure 4.1 clearly indicated that more respondents 63(42.0%) were of the age range between 30-39 years, followed by 21-29 which had 56 (37.3%) respondents. The third age cohort was 40-49 which had 25(16.7%) respondents. The fourth age cohort was 50-59, 5(3.3%), and the last age group was 60 and above which comprised of 1(0.7%) respondent. The findings above imply that majority 119(79.3%) of sampled students were between the age of 21 and 39 which suggest that they are the economic active group and more motivated to pursue different courses offered in higher learning institutions like OUT. Implied here is that their perception on the use of soft copy materials especially CD based study materials is

likely to be positive. On the other hand, the respondents who fall under the age category of 50-60 and above were 6(4.0%). This implies that most of them were in retirement age and were likely to have negative perception towards the use of CD based study materials because, as outlined by Rogers and Shoemaker (1971), these are likely to fall in the category of conservative or traditionalist who constitute later adopters or laggards of new technology (innovation).

4.2.2 Gender of the Respondents

Gender of respondents is an important factor in determining ones perception towards acceptance of the use of new technologies in the teaching and learning in ODL institutions (Rhema & Miliszewska, 2014). The researcher was interested in finding out the gender of the respondents. The study had sampled 82 (55%) males and 68 (45%) females as indicated in Figure 4.2 below.

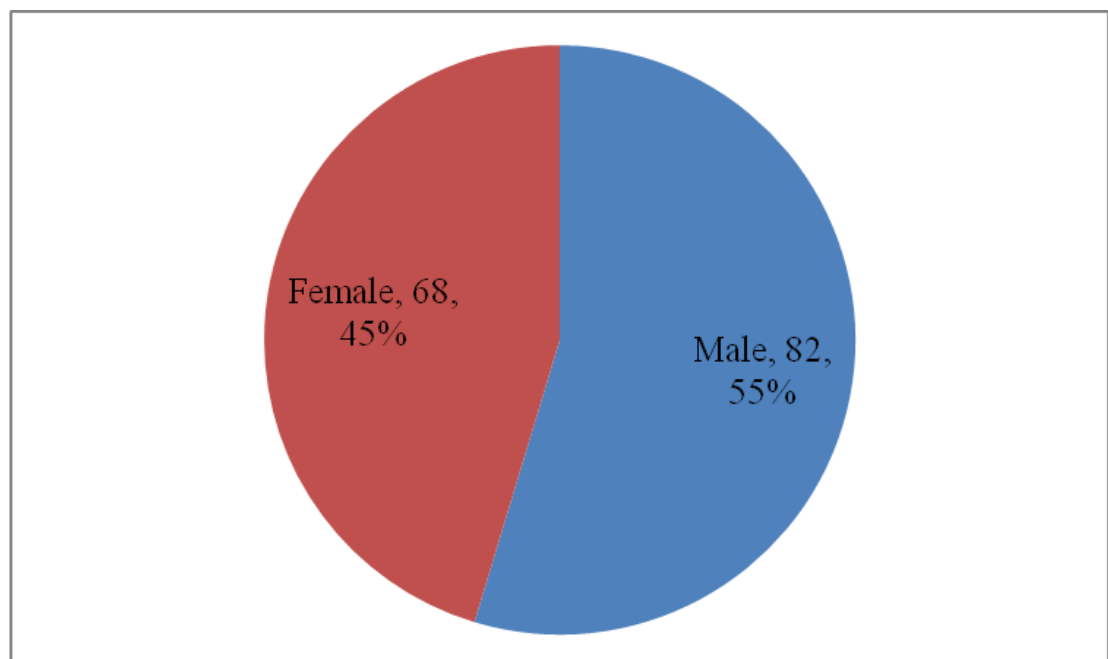


Figure 4.2: Gender of Respondents

Source: Fied data, 2016

4.2.3 Respondents' Educational Background

Another important variable in determining students' perception towards the use of CD based study materials was educational background. The researcher wanted to find out the level of education the student had before joining the programme. The results indicate that many respondents 69(46.0%) were diploma holders followed by 46(30.7%) who were form six leavers. The rest 35(23.3%) joined the programme with certificate qualifications (Table 4. 1). Probably many respondents with diploma joined the OUT as in-service who wanted to upgrade and it could be expected that they had prior experience in using computers at their work places.

Table 4.1: Respondents' Education Background

Variables	Frequency (F)	Percentage (%)
Diploma	69	46.0
Form six	46	30.7
Certificate	35	23.3
Total	150	100

Source: Field data, 2016

4.2.4 Respondents' Involvement in the Study Faculty-Wise

On the other hand, the study sought to find out generally respondents' involvement in the study faculty-wise. The findings revealed that out of 150 sampled students, 42 (28%) FASS, 52 (34.7%) FED, 27 (18%) FBM, 12 (8%) FLW and 4 (2.7%) FSTES and 13 (8.7%) were from ICE. Most of the students involved in this study were from Faculty of Education (FED) because their enrolment number according to OUT Facts and Figures (2015) is higher (e.g 1850, 1374 and 694 students in 2012/2013, 2013/2014 and 2014/2015 academic years respectively) when compared with

students in other faculties. Therefore, the probability was to meet higher number of them when conveniently sampling as data in Table 4.2 indicate.

Table 4.2: Respondents' Involvement in the Study Faculty Wise

Faculty	Frequency	Percentage
FASS	42	28.0
FED	52	34.7
FBM	27	18.0
FLW	12	8.0
FSTES	4	2.7
ICE	13	8.7
Total	150	100

Source: Field data, 2016

4.3 Students' Perception on the Use of CD-Based Study Materials in the Learning Process

The first question of this study sought to assess students' perception on the use of CD based study materials in their learning process. With the introduction of any new technology in the learning process students may develop sense of awareness that can be impacted into different perceptions on whether to accept the technology or not and therefore make use of it. The researcher was thus interested in gathering information on the level of awareness and their perception based on perceived usefulness of the technology as well as preference on the mode of delivery. The results thus are outlined in three levels including awareness of students on the use of CD based study materials, perceived usefulness of CD based study materials, and students' preference on the mode of delivery.

4.3.1 Students' Awareness of the Use of CD Based Study Materials

Awareness of the introduction of new technologies in the teaching and learning process is considered as a necessary condition in determining one's perception towards acceptance of such imposed technology. Lack of awareness goes along with attitude to accept the technology or not. Under such context, respondents from the study area were asked whether they were aware of the use of CD based study materials or not. The findings revealed that majority of students 120 (80%) were aware of the use of CD based study materials in the teaching and learning process at the OUT while 30(20%) were not aware as indicated in Figure 4.3. High awareness in the use of CD based study materials is attributed to the wide spread of information from their colleagues or during orientation days. This awareness may have implications with the actual use of the new technologies imposed to learners. However, few respondents (20%) who were not aware of the use of CD based study materials are likely to develop negative feeling in using CD.

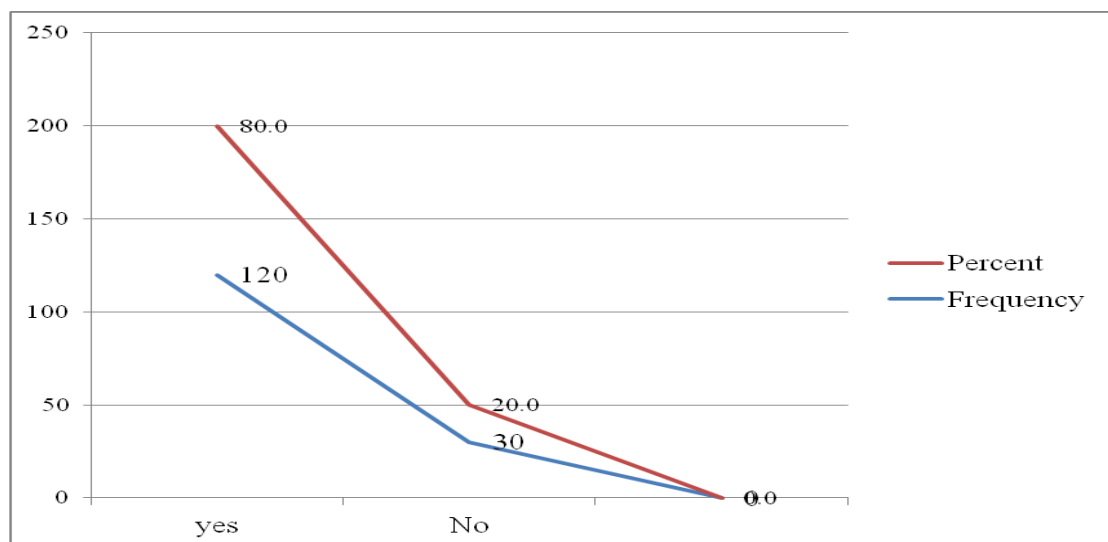


Figure 4.3: Students' Awareness of the Use of CD Based Study Materials

Source: Field data, 2016

The researcher was further interested in finding out the time when the students first heard about the CD based study materials. Some 120(80%) students who have reported to be aware of the use of CD based study materials were probed on how they came to know about the availability of CD based study materials at their centers. The findings indicate that 78(52%) of respondents heard about the CD based study materials during initial Orientation period, 33(22%) during course registration, 6(4%) during examinations and 3(2%) during application. The results further indicates that 30(20%) of respondents had not heard about the use of CD based study materials and therefore had no response indicating the source of information about the existence of CD based study (Figure 4.4).

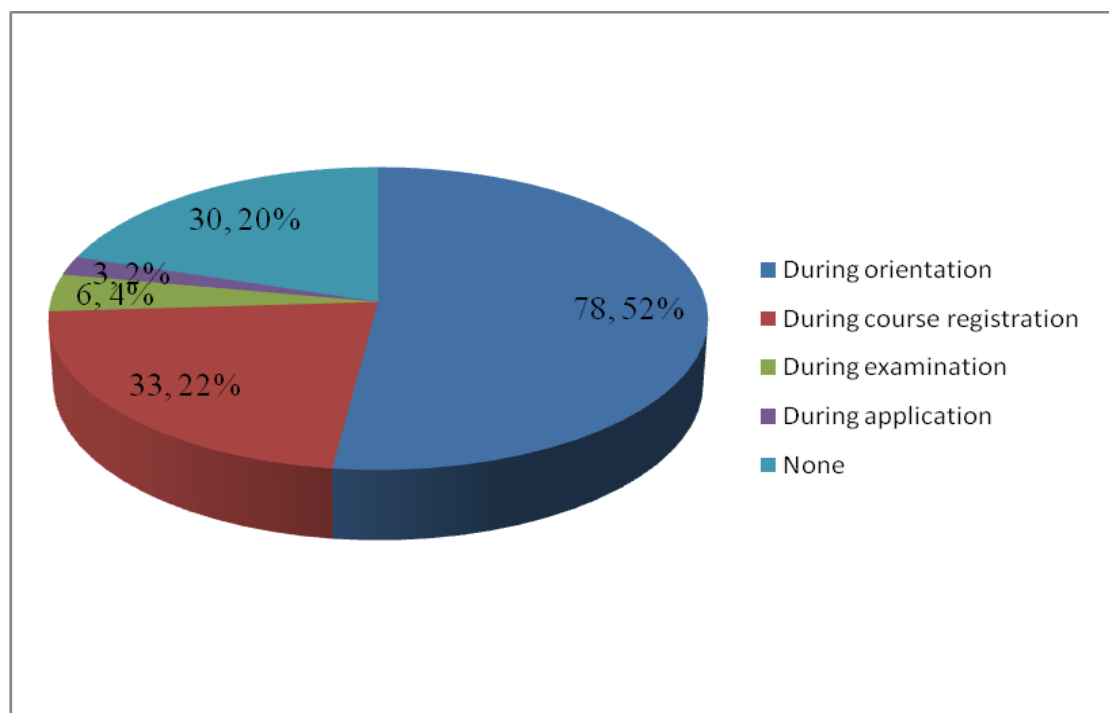


Figure 4.4: Source of Information about the Existence of CD Based Study Materials

Source: Field data, 2016

Generally the results from Figure 4.4 above indicate that majority students had heard about the existence of CD based study materials during orientation and course registration, a time when they start using these instructional materials in the preparation of learning. The wide source of information about the use of CD based study materials is expected to increase the level of usage of CD mode of delivery. These findings were supported by regional directors and Regional Record Management Assistants (RRMA) from the studied centers. During interview, they had this to say:

- i) *Normally during orientation days and course registration period we inform our newly admitted students and keep on reminding continuing students of the available CD based study materials at our centre (DRC-Kinondoni)*
- ii) *Our students are constantly reminded on the use of CD based study materials. New students are informed during orientations, course registration and reminded during examinations sessions (DRC-Tanga)*
- iii) *I normally send text messages to our students to ask them to come and collect CDs for their various registered courses during course registration. For those who are not aware I always spend time telling them about this support service (RRMA-Tanga).*

The general picture from the findings indicates that majority of students more being male students are aware of the available CD based study materials as one of the support services in their learning process. Furthermore, during orientations and course registration period directors and other staff of the regional centres take initiatives to inform students about this service so as to increasing their awareness about CD based study materials.

4.3.2 Perceived Usefulness of CD Based Study Materials

Perceived usefulness as one of the TAM's main constructs reflects the level to which an individual believes that using a new system would improve the task performance. Considering this, the respondents were asked to rate the perceived usefulness of CD based study material in a likert scale. The responses were categorized in seven categories which reflected their level of agreement as outlined in tables 4.3 to 4.10 below.

Table 4.3: Developing Confidence in Using Computer and CD Based Study Materials

Variables	Frequency	Percent
Strongly agree	26	17.3
Agree	69	46.0
Neither agree nor disagree	25	16.7
Disagree	27	18.0
Strongly disagree	3	2.0
Total	150	100

Source: Field data, 2016

Results from Table 4.3 indicated that 69(46.0%) students agreed with the assertion that they felt confident in using CD based study materials while 27(18.0%) disagreed and 25 (16.7%) neither agreed nor disagreed with the statement. The findings imply that majority of students 95(63.3%) developed confidence in using computers and CD based study materials in their learning process. Probably this is influenced by addition of more materials that cannot be obtained from the hardcopy.

However, those who neither agreed nor disagreed could be the result from being not aware of the use of CD based study materials in the teaching and learning process at

OUT. Magagula (2005) in that regard reported that CDs provide supplementary readings and resources for the learners and facilitators that were accessible separately from the course structure. Similarly, Lynch (2014) asserted that when ODL students use CD-based study materials as complementary to other learning resources they enhance their access to various resources, learning becomes fun and increases understanding of concepts

Focus group discussion with learners also confirmed this. During discussion the students made the following statement that reflected the perceived benefit of CD based study materials in learning process.

- i) *.....with the use of CD based study materials we develop some confidence since it consists of wide range materials compared to hard copy materials” (FGD’s participant Kinondoni).*
- ii) *I feel more confident in using CD based study materials than hard copy materials because the content being presented is to the point and need not be supplemented (FGD’s participant Tanga)*

These findings imply that students perceived the use of CD based study materials as being beneficial to them because they develop the confidence to use computers which in turn help them to access materials from the CDs.

Table 4.4: CD Based Study Materials Help in Understanding Things More Clearly

Variables	Frequency	Percent
Strongly agree	21	14.0
Agree	60	40.0
Neither agree nor disagree	31	20.7
Disagree	30	20.0
Strongly disagree	8	5.3
Total	150	100

Source: Field data, 2016

With regards to understanding things clearly during the learning process, 60(40%) students agreed with this statement while 8(5.3%) strongly disagreed. It is evident from the findings that majority 81(54%) viewed that they understand things more clearly when using CD based study materials than with hardcopy materials, 38(25.3%) disagreed and 31(20.7%) were neutral. The findings were supported by students during focus group discussion. During discussion three students had this to say:

- i) *I normally use CD based study materials because they are comprehensive and cover a wide range of content (FGD's participant Katavi)*
- ii) *I understand things more clearly when using CD based study materials than hardcopy because materials are clearer and attractive with elaborated diagram (FGD's participant Tanga)*
- iii) *Instead of reading lengthy paragraphs in printed study material I am presented with small chunks of content in the CD based study materials that increase my understanding and retention (FGD's participant Kinondoni)*

The statements imply that learners understand things more clearly when using CD based study materials probably due to the availability of the supplementary readings and materials that are accessible separately from the course structure.

Table 4.5: CD Based Study Materials are Easier to Access than Hardcopy Study Materials

Variables	Frequency	Percent
Strongly agree	24	16
Agree	50	33.3
Neither agree nor disagree	35	23.3
Disagree	28	18.7
Strongly disagree	13	8.7
Total	150	100

Source: Field data, 2016

Results from table 4.5 indicate that 50(33.3%) agreed that CD based study materials are easier to access than hardcopy study materials. Some 13(8.7%) strongly disagreed while 35(23.3%) neither agreed nor disagreed with the statement. It is evident that 74(49.3%) of respondents were positive with access to CD based study materials while those who disagreed constituted 41(27%) of all respondents. Possibly CD based study materials are readily available at each regional center where most students are being registered.

Contrary to this, key informants in the sampled area reported that CD based study materials are available at the centers but are not enough for each registered student:

The following comments epitomize the majority:

- i) *CD based study materials are available at our centers on the commencement of new academic year and are provided to students during course registration. However, they are not enough for each student, so we normally ask students to bring their own empty CDs and burn them (DRC's statement)*
- ii) *CDs are available but not enough according to the number of students. Meanwhile we normally use external hard disks to save the materials and ask each student to bring his or her flash or empty CD to save the materials (RRMA's-response)*

Findings from documentary review have indicated that there is shortage of CD based study materials as they are brought in less number compared to the number of registered students for each centre and course as indicated in Table 4.6. Furthermore, some new courses do not have CDs at all. This shortage meant some students who missed respective course materials would have to incur unexpected costs to obtain empty CDs and transfer the materials through burning which may have caused them to develop negative perception towards the use of CD based study materials.

Table 4.6: Availability of CD Based Study Materials at Regional Centers

Regional centre	Year	Number of Registered Students	No. of Required CDs	Faculty/Institute	No. of Available CDs	Shortage
Tanga	2014	222	222	FASS	36	87
				FBM	34	
				FED	2	
				FLW	0	
				FSTES	33	
				ICE	30	
	2015	115	115	FASS	20	30
				FBM	23	
				FED	2	
				FLW	5	
				FSTES	23	
				ICE	12	
Kinondoni	2014	1035	1035	FASS	252	274
				FBM	166	
				FED	30	
				FLW	1	
				FSTES	247	
				ICE	65	
	2015	1653	1653	FASS	103	1316
				FBM	54	
				FED	12	
				FLW	11	
				FSTES	115	
				ICE	42	
Katavi	2014	93	93	FASS	10	38
				FBM	12	
				FED	1	
				FLW	0	
				FSTES	21	
				ICE	11	
	2015	110	110	FASS	8	59
				FBM	10	
				FED	2	
				FLW	2	
				FSTES	14	
				ICE	15	

Source: OUT Facts and figures (2015), Regional centers' inventory documents

Table 4.7: CD Based Study Materials Increase Chances in Passing a Course

Variables	Frequency	Percent
Strongly agree	18	12
Agree	57	38
Neither agree nor disagree	42	28
Disagree	25	16.7
Strongly disagree	8	5.3
Total	150	100

Source: Field data, 2016

The results in increasing chances in passing the courses as one of the usefulness of using CD based study materials as outlined in table 4.6 indicated that, 57(38%) of respondents agreed, 42(28%) neither agreed nor disagreed while 8(5.3%) strongly disagreed. The majority 75(50%) agreed that CD based study materials increased the chances of passing the course while 33(22%) disagreed to this reason. This implies that the use of CD based study materials provides the students with supplements materials that can assist them to widen the scope of understanding and performing much better in their course. Lynch (2014) asserted that the use of CDs is such an amazing form of learning technology for students who need a way to learn which is different and more flexible. This implies that when courses are delivered through the use of CD-based study materials, they increase students' learning flexibility hence improve students' graduation rate.

In supporting this, during discussion one of the participants had this to say:

The introduction of CD based study materials at OUT provided more assistance to me as I managed to perform all courses that were so difficult previously (FDGs participant).

However, few respondents who disagreed with the statement were likely to have negative feelings towards CD based study materials.

Table 4.8: CD Based Study Materials are Easy to Carry and Store Compared to Printed Materials

Variables	Frequency	Percent
Strongly agree	46	30.7
Agree	61	40.7
Neither agree nor disagree	17	15.3
Disagree	23	18.7
Strongly disagree	3	2
Total	150	100

Source: Field data, 2016

Results from Table 4.8 revealed that 61(40.7%) students agreed, 46(30.7%) strongly agreed while 3(2%) strongly disagreed that CD based study materials are easy to carry and store than hardcopy materials. These results generally indicate that majority 107(71.4%) positively agreed with the reason while 26(20.7%) disagreed, and 17(15.3%) neither agreed nor disagreed.

These findings were confirmed by focus group discussions with students. During discussion three students had this to say:

- i) *I enjoy using CD based study materials because of their portability. I don't have to carry a lot of hard copy materials during studying. All things are in my CD (FGD's participant Katavi)*
- ii) *It is possible to collect volumes of books in one CD. So I like CD based study materials because it is portable and I can use it any time and in any place (FGD's participant Kinondoni)*
- iii) *CD-based materials are user friendly as they can be used at any place and any time convenience. They are easy to carry and store compared to printed material (FGD's participant Tanga)*

Table 4.9: CD Based Study Materials help in Improving the Teaching and Learning at OUT

Variables	Frequency	Percent
Strongly agree	43	28.7
Agree	60	40
Neither agree nor disagree	22	14.7
Disagree	22	14.7
Strongly disagree	3	2
Total	150	100

Source: Field data, 2016

Table 4.9 indicates that in improving the quality of higher education, 60(40%) of the respondents agreed, 43(28%) strongly agreed while those who disagreed constituted 22(14.7%). From the results it is noticed that majority 103(68%) agreed that CD based study materials improve the quality of higher education at the OUT against 25(16.7%) who viewed contrarily. The findings suggest that the introduction of the soft copy materials in particular CDs has improved the standard of teaching and learning at the OUT.

Focus group discussion with students confirmed this. During discussion, one student explained that:

I am a student pursuing Bachelor of Science with Education. I joined the university in 2008 when we used to have hardcopy materials. Unfortunately I failed some of my courses and had to repeat them because of lack of study materials for my courses. Since the introduction of CD based study materials, I have received all the materials I need for my programme and this has improved my performance.

Interviews with DRCs revealed similarly as exemplified by the following statement:

The quality of education offered at OUT has been improved after invention of new technology of using CD based study materials. Even students completion rate has increased.

Table 4.10: CD Based Study Materials Provide Opportunity to Acquire New Knowledge and Improve Learning Experience

Variables	Frequency	Percent
Strongly agree	32	21.3
Agree	66	44
Neither agree nor disagree	21	14
Disagree	24	16
Strongly disagree	7	4.7
Total	150	100

Source: Field data, 2016

Further results were based on the opportunity to acquire new knowledge and improving learning experience. The results from table 4.9 indicated that 66(44.0%) respondents agreed, 32(21.3%) strongly agreed while 7(4.7%) strongly disagreed with the reason thus making a total of 98(65.3%) respondents who agreed and 31(20.7%) who disagreed. The rest 21(14%) neither agreed nor disagreed. Implied from the findings is that the high percentage of respondents with positive attitude in CD based study materials were expected to develop interactive skills and note taking techniques in using computers and CDs. In focus group discussion this was similarly raised by the participants as is exemplified by the following statement:

In CD based study materials, the content is presented in point form that may enable the learners to acquire note taking technique in an easy way.

Generally it can be concluded from the findings above that majority of respondents had positive attitudes towards the use of CD based study materials. The perceived benefit of CD based study materials is associated with the effectiveness of the mode of delivering that is common at OUT. Nihuka (2011) noted that the perceived benefits of particular technologies have great influence on whether or not to use a

technology. The findings concurred by those of Nassoura (2012) who asserted that University students in developing countries have varying attitudes towards CD based materials but generally their attitudes are positive because they found that CD based materials had a positive impact on their motivation as well as self-esteem. Despite the perceived usefulness, few respondents perceive the use of CD based study materials in a negative way. The perceived negative could be attributed to lack of awareness of existence of CD based study materials and the shortcomings of the technology as will be revealed later in this work. Hence students were likely to be uncomfortable in using the technology rather than other modes of delivery such as printed materials.

4.3.3 Students' Preference on CD Mode of Delivery

In connection with the foregoing discussion, the researcher was interested to capture learners' views regarding their preference on the mode of instructional delivery. Responses as presented in Figure 4.5 below revealed that majority of respondents 96(64%) preferred CD based study materials while 54(36%) did not.

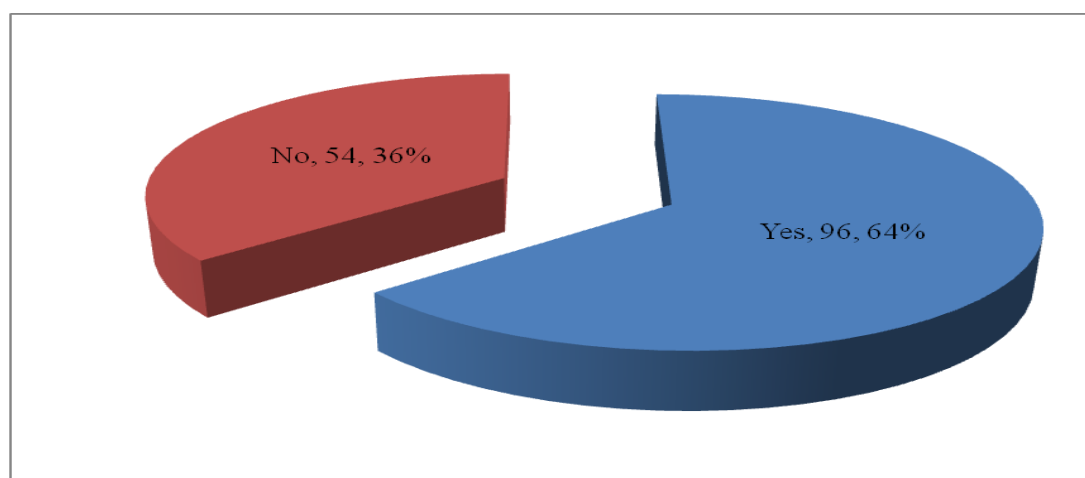


Figure 4.5: Students' Preference on CD based mode of Delivery

Source: Field data, 2016

This implies that majority are expected to accept the use of CD based study materials in their learning process due to the perceived usefulness discussed in the previous sub-section. Contrary to that, many respondents who do not prefer CD based study materials tend to use other modes of delivery.

4.4 Students' Access to Computers

The second research question aimed at examining whether access to electronic devices will have effect on students' perception towards the use of CD based study materials in the learning process. The researcher therefore assessed whether the respondents had an access to electronic devices. The findings from *Figure 4.6* indicate that 81(54%) of learners reported to have access to computers compared to 69 (46%) who did not have. This signifies that many students could be using CD based study materials as a mode of learning. Conversely, 46% of students with no access to computers were expected to use other modes of delivery.

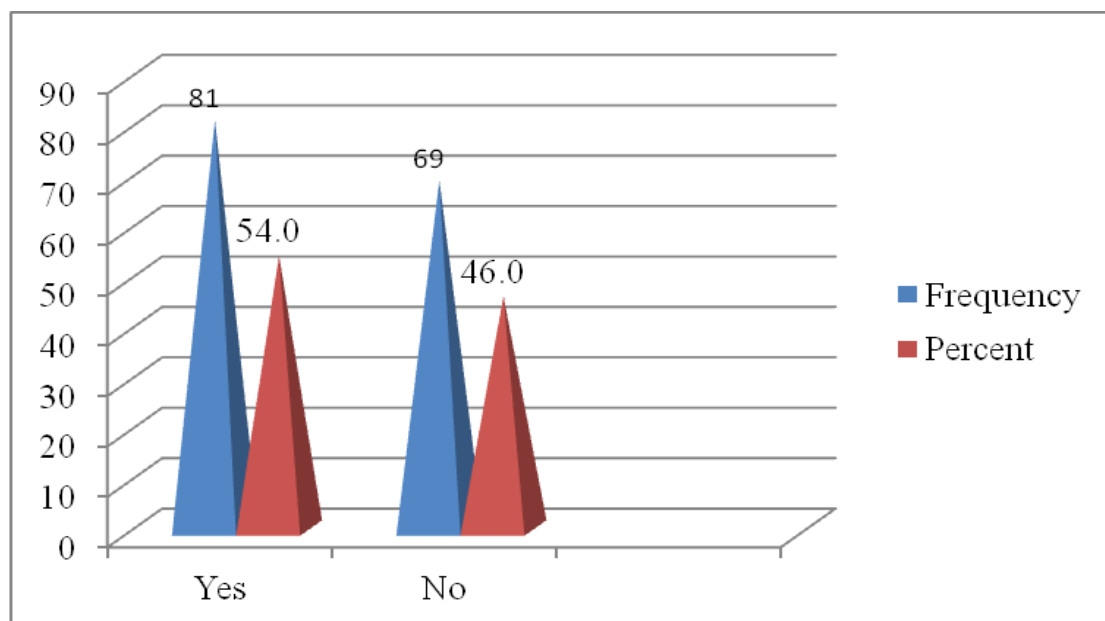


Figure: 4.6: Accessibility to Computer

Source: Field data, 2016

The respondents were further asked to identify the kinds of technology they owned. On the types of computers owned by students 91(47.2%) of respondents reported to possess laptop computers, 60(31%) own desktop computers while 42(21.8%) do own neither laptops nor desktop computers. Table 4.10 below presents the response findings.

Table 4.11: Students' Access to Different Types of Computers

Type of technology	Responses	
	Frequency	Percentage
Desktop computer	60	31
Laptop computer	91	47.2
None	42	21.8
Total	193	100

Source: Field data, 2016

Generally, data from Table 4.11 revealed that majority of students 78.2% acknowledged having computers. Implied from the findings is that with the improvement of information technology, higher learning students' possession of computers for academic matters is a prerequisite. The finding concurred to what was raised during focus group discussions when the participants disclosed that they had no problem with possession of computers which they used for their learning process.

During focus group discussion, the following statements were made:

- i) *When I joined the university I did not have a computer. But when I found out that study materials are obtained from the CDs I had to buy my own laptop. So I have my laptop and it really helps me a lot.*
- ii) *I have no problem in accessing computers. I have a desktop computer and a laptop which I use for my studies.*

- iii) *People move from analog to digital. So possession of computer is a prerequisite. Thus I am not expecting a university student to lack access to computers.*

These statements indicate that students' attitude towards the use of CD based study materials is likely to be positive because majority of them have access to computers of their own.

Contrary to this, it was also indicated from the findings that a number of respondents 42(21.8%) did not own laptops or desktop computers. For such respondents their perception towards the use of CD based study materials was expected to be negative. This may lead to the decrease of CD based study material use. These findings were supported by the participants in focus group discussions. The following comments epitomize the majority:

- i) *Frankly speaking I don't have a computer of my own, even in my working place there isn't. In this situation I do not use CD based study materials and instead I have to print the materials from the CD to use them as hardcopy. This is so expensive for me.*
- ii) *Possession of a computer for me is a big problem. I have tried to find one but in vain, thus I cannot access materials from the CDs unless I study with my colleagues who have laptops.*

Interviews with the directors of regional centers reported similarly that a good number of students did not possess computers which are considered necessary devices for their learning. In justifying this, the following statements were made by centre directors:

- i) *Honestly, most of our students do not have computers. As such they normally use hardcopy materials to facilitate their learning. I normally encourage them to make efforts to buy*

their own computers which will help them in their learning process.

- ii) *Our students especially those from rural areas have problem in accessing computers. This situation forces them to have negative perception towards the use of CD based study materials in their learning process hence they opt to use hardcopy materials.*

Basing on the findings above the researcher went further to interview centre directors whether the centers had computer labs and what the centers did to help those students with no access to computers to use CD based study materials. The findings have indicated that all the three sampled regional centers have computer laboratories. However, it was observed that students do not make effective use of the computer laboratories as was elaborated by regional directors during interviews.

- i) *Computer facilities are available at our centre. We have a computer laboratory with modern computers but students don't make use of these computers because of the geographical location where many students live that is very far from the centre. So they fail to come and study during working hours.*
- ii) *We have a very good computer laboratory and a technician to help students with ICT problems. However, our students do not make effective use of this laboratory and instead some go to internet café which are more expensive for them.*
- iii) *Our centre has a computer laboratory that is meant to facilitate learning and help students who have no access to computers. However, the lab is not fully utilized by students as expected as most of the learners live far from the centre and for those who live near to the center still they cannot use the lab because most of them are employed somewhere and are expecting to come for private study after 16.00 pm when the lab is already closed.*

It can be concluded from the findings above that computer ownership is a preliminary factor in determining students' perception and their willingness to use the CD based study materials in the learning process. Rhema and Miliszewska (2014)

demonstrated that students who had better access to various technologies generated stronger positive attitudes towards e-learning than those students with no access to technology. This is also supported by Tagoe (2012) who observed that acceptance of e-learning depended on computer ownership.

4.5 Students' Use of CD Based Study Materials in the Learning Process

The third research question sought to assess about students' actual use of CD based study materials in the learning process. The respondents were probed if they used CD based study materials as a mode of delivery. Figure 4.7 presents the findings.

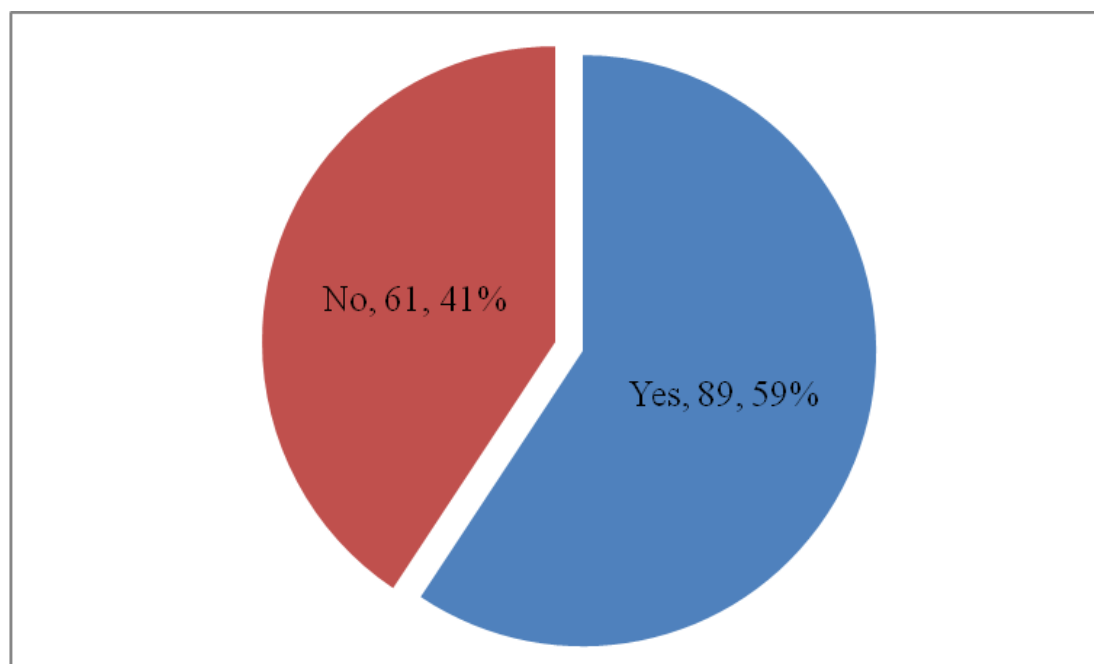


Figure 4.7: Students' use of CD Based Study Materials

Source: Field data, 2016

The findings from Figure 4.7 demonstrate that majority 89(59%) agreed on the use of CD based study materials against 61(41%) who indicated that they did not use CD

based study materials in their learning process. The observed higher percentage of respondents who use CD based study materials can be associated with the accessibility of computers as already explained and skills of using the electronic device. Conversely, a significant percentage (41%) of respondents admitted to avoid the use of CD based study materials. Perhaps the rejection of CD based study materials use could be coupled with lack of relevant skills and accessibility of computers. The findings concurred with those of Kaputa and Mpezeni (2016) who observed that most learners with access to computers tended to find e-learning more acceptable whilst those without the computers saw the introduction of modules on CDs as the end of their dream to become graduates.

The researcher went further to examine the extent to which students use the CD based study materials in their learning process. Figure 4.8 presents the findings.

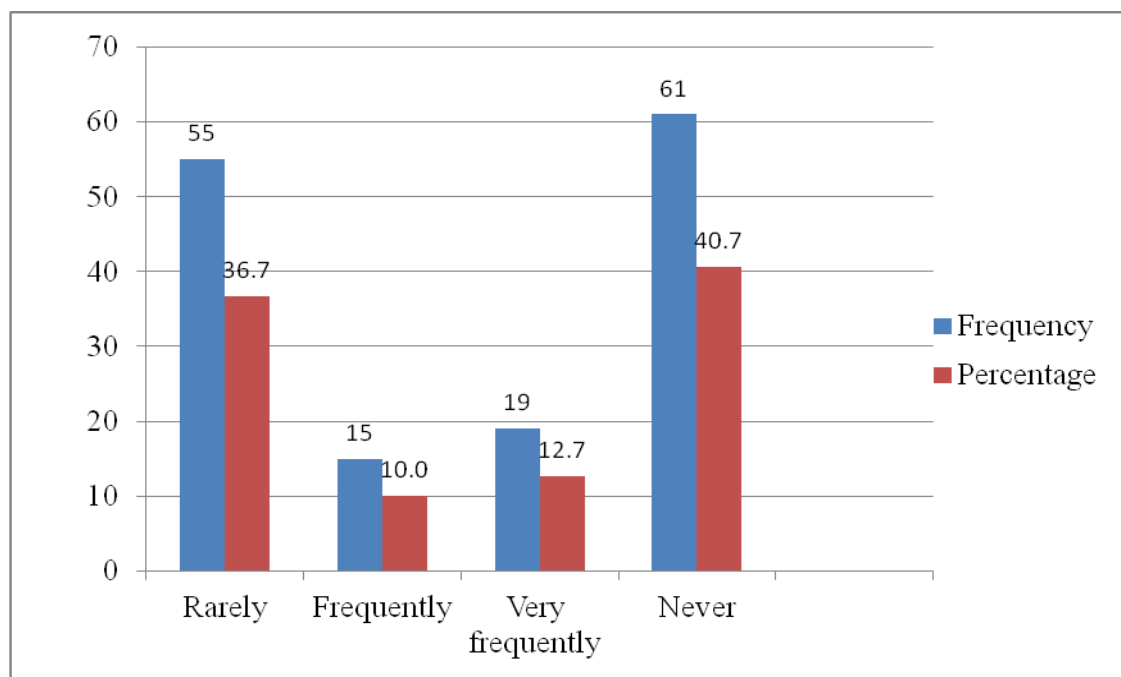


Figure 4.8: How often the CD Based Study Materials are Used

Source: Field data 2016

It is noticeable from Figure 4.8 that 61(40.7%) of respondents never use CD based study materials in their learning process while 55(36.7%) students rarely use them. Furthermore, 19(12.7%) of respondents used CD based study materials very frequently while 15(10%) frequently used them.

The findings imply that though many respondents (59.4%) use CD based study materials compared to those who do not use, their manner and extent of use varies. Considering the number of respondents who rarely or never use CD based study materials 116(77.4%), it appeared that these use either exclusively the traditional modes of delivery such as hard copy materials including printed study materials, books or mix in smaller proportion with the CD based mode of delivery and internet search.

Focus group discussions with students revealed that most students who never use CD based study materials use other means in their learning. Most of them print the materials from the CDs and use them as hardcopies as was exemplified by the group participants:

- i) *Since I cannot access materials from the CDs I have to use printed hardcopy of the same materials.*
- ii) *I much prefer to use printed resources because I am familiar with them. I can turn the pages and study properly without worrying about wasting valuable time.*
- iii) *CD based study materials satisfy those who have access to computers and skills to operate it but create bias to those who haven't. So it is better to use hardcopy materials in the learning process as this can favor the haves and have-nots.*

Furthermore, interviews with Regional directors revealed that they have to make initiative of printing study materials to help those students who never use softcopy materials in CD forms. During interviews, two directors had this to say:

- i) *Because some students cannot access materials from the CDs, the office in collaboration with the Students Organization (OUTSO) print and make copies of hardcopy materials to help those who are in need.*
- ii) *Some students complain of failing to study because they are unable to use CD based study materials. To help them we have to print materials from the CDs for some of the courses and make copies for them to access with cheap price. For other courses we advise them to make hardcopies on their own*

Although many students from the study areas use CD based study materials, there is also great variation in terms of time spent throughout a week. This variation could be attributed to various challenges associated with actual use.

4.5.1 Level of Knowledge and Skills in Using Computers

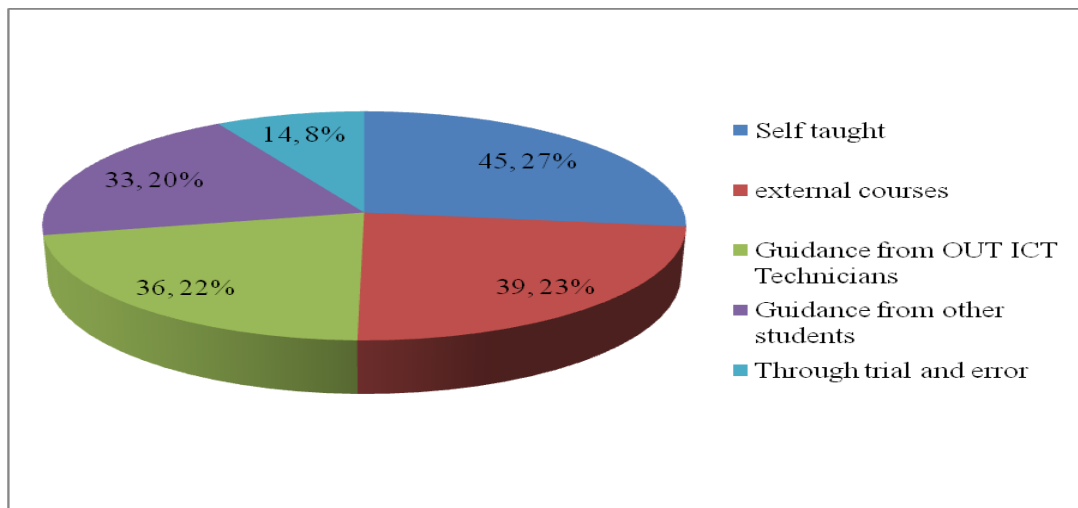
In this sub section, the researcher wanted to gather information on respondents' levels of knowledge and skills which are considered as important factors in determining the actual use of CD based study materials. According to TAM, perception to use e-learning resources is influenced by perceived ease of use of e-learning technology. Findings from this study have revealed that majority of students 89(59.3%) are skilled in using computers while 61(40.7%) are not (Table 4.12). Possibly majority from the study area had access to computers which reflects their skills in using them. This implies that the extent of CD based study materials could be high. On the other hand 40.7% of the respondents with no computer skills may use other modes of delivery in their learning process.

Table 4.12: Students' Level of Skill in Using Computers

Responses	Frequency	Percentage
Skilled	89	59.3
Not Skilled	61	40.7
Total	150	100

Source: Field data, 2016

Basing on the findings above the researcher wanted to find out how the learners obtained skills in using computers to access materials from the CDs. Figure 4.9 presents the findings.

**Figure 4.9: Ways through which Students Learned to Use Computers**

Source: Field Data 2016

It is noticed from Figure 4.9 that self taught was leading with 45 (27%) of respondents, 14 (8%) obtained skills to use computers through trial and error, 39 (23%) through external courses, 36 (22%) through guidance from OUT ICT technicians and 33(20%) through guidance from other students. This is in line with what Tagoe (2012) reported that most students have acquired computer skills before entering the university and for those who did not have the skills, the university,

friends and family members provided opportunities for these students to acquire computer skills. Furthermore, Ray and Day (1998) observed that the most popular method of acquiring the necessary skills to use electronic resources was via Trial and Error followed by guidance from other students, guidance from library staff and through self taught which was ranked the lowest.

Interviews with OUT ICT technicians disclosed that the OUT management organizes a two days ICT skills training programme for OUT students in each academic year during the orientation days and face to face sessions so as to ensure that continuing and newly admitted students are knowledgeable on the use of electronic materials offered by the OUT. Furthermore, the technicians reported that each student is subject to undergo a compulsory basic computer course so as to familiarize with ICT learning process. During interview, two ICT technicians explained that:

- i) *The OUT management organizes a two days ICT training skills programme during the commencement of new academic year and during face to face sessions for our students on how to access materials from the interactive CDs available at all regional centres and on how to make online courses and exams registration and how to access exams results.*
- ii) *Our students receive a course on introduction to computer which is compulsory to any degree and non degree students with the aim of providing basic skills on computer so as to help learners who have little or no skills in ICT. So it is easier for them to have skills in using computes.*

The statements above imply that despite the ICT training organized by the OUT management, still some students lack skills in accessing materials from the CDs. This concurred with what Kaputa and Mpezeni (2016) observed that most learners

had problems in using the CDs due to lack of computer skills despite having done the initial computer courses offered by the university.

Implied from the findings is that students' level of computer skills and experience is a prerequisite factor in determining their perception towards the use of CD based study materials. Having prior computer skills and experience will make the technology easy to use and thus increase the level of usage. The findings supported what Siritongthaworn et al. (2006) observed that, students with poor computer competences and skills perceive e-learning technologies use as difficult compared to those with comparatively good computer skills.

4.5.2 Challenges Encountered when Using CD Based Study Materials

In examining the cumulative effect of the foregoing discussion on students' perception towards the use of CD based study materials during the learning process, the researcher wanted to find out if there are any challenges encountered when using CD based study materials. Figure 4.10 below presents the summary of the findings.

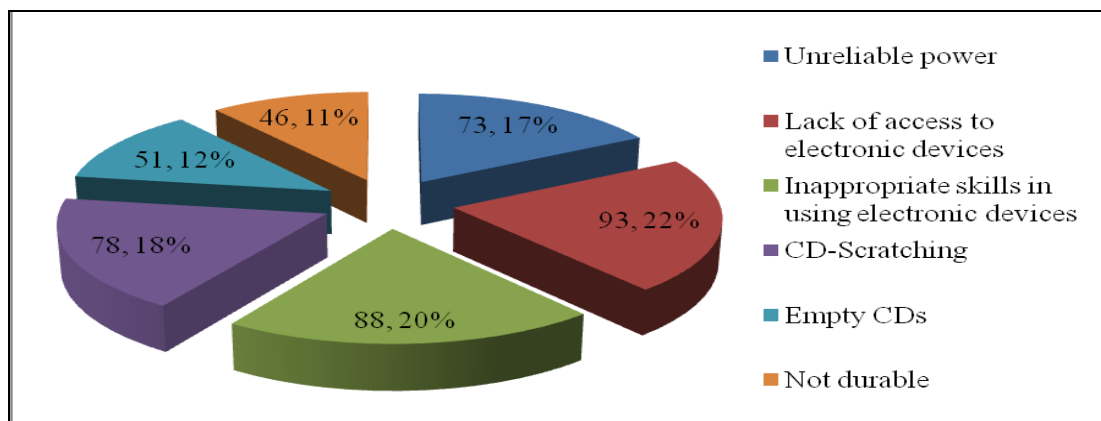


Figure 4.10: Challenges Encountered by Students in Using CD Based Study Materials

Source: Field data, 2016

It is noticeable from Figure 4.10 that there are slight differences in the ranking with lack of access to electronic devices occupying the leading rank 93(22%), followed by inappropriate skills in using electronic devices 88 (20%), scratching of the CDs 78(18%), unreliable power 73 (17%), empty CDs 51(12%) and 46(11%) not durable.

Regarding lack of access to electronic device the study observed that majority of respondents 22% claimed that lack of accessibility to electronic devices is the major challenge that may constrain the use of CD based study materials. The findings concurred with what Hussain (2007) reported that, students' ability to use ICTs is significantly hindered by low level of technology access and use.

The study findings also revealed that 20% of respondents identified that inappropriate skills in using electronic device such as computers provided a challenge in accessing materials from the CDs. Focus group discussion with students also revealed the same. During group discussion, two respondents complained that:

- i) *I was totally discouraged when I failed to access materials from the CD because of lack of skills in computer usage. I received a CD from the center's library and when I went home I placed the CD into my TV deck and nothing was displayed. I was then told that I couldn't use the TV deck to access materials from the CD. The next day I returned it to the centre and since then I have not used CDs.*
- ii) *Considering that I don't have any skills in using computers, I cannot use the CD based study materials*

Considering scratching of the CDs, majority 78(18%) identified this as a challenge that hindered them from making effective use of CD based study materials. According to them, repeated use of CDs degrades its quality and as a result they fail

to utilize this resource efficiently. Hampton (2002) states that scratching the surface of the CDs or other abuses of the medium may prohibit it from being read by the CD-ROM drive.

Unreliable electric supply was another challenge identified by the respondents that limited their effective use of this resource. Majority 73(17%) of respondents reported about this problem when using CD based study materials in their learning process. Focus group discussion with learners confirmed this as one respondent explained.

I was studying at my center premises and my laptop had no enough power. Unfortunately the power went off. I had to go back home and that was the end of studying on that day.

Another challenge reported by respondents involved receiving empty CDs. The findings of the study revealed that 51(12%) of respondents pointed out that some of the CDs received were empty. Focus group discussion with respondents disclosed that some had received empty CDs from the centre. During discussion, two respondents explained that:

- i) *I was so discouraged when I found out that the CD I had received from the centre was empty. I had to return it after a week of not studying.*
- ii) *I was preparing myself for the exams when I found out that the CD was empty. Truly I wasn't comfortable and what I did was to postpone the exams.*

Interviews with RRMA/regional librarian confirmed this. During interview two of them had this to say:

- i) *Honestly, some of the CDs I received are empty and without knowing I issued them to students. However, when students find nothing in them they come and replace them*

- ii) *I have received several cases from students complaining of having received empty CDs. What I do is to ask them to bring flash disks so that I save the materials in their flash.*

This suggest that the organ concerned with quality assurance is not engaged fully in crosschecking the value of soft and hardware materials involved in students' learning.

Further challenge was associated with durability of the CDs where 46(11%) of respondents complained about this. Most of these respondents complained that the CDs they receive are of low quality hence, not durable.

Interviews with all key informants identified lack of access to computers, lack of skills in using computers to access materials from the CDs, as well as computer anxiety as among the major challenges that are associated with the use of CD based study materials among students. According to Amaride and Balarinwa (2010), the major constraints hindering the use of electronic resources include poor power supply, poor infrastructure, lack of adequate skill and unavailability of computers. It can be inferred from the findings that the varied perception towards the use of CD based study materials could be associated with any, some, all, or even more of challenges encountered by students when using them.

In view of the benefits of using CD based study materials and the challenges encountered, the respondents were further probed on their perceptions regarding the effectiveness of CD based study materials at the OUT. The findings indicated that

majority of students 88(58%) viewed positively that CD based study materials is an effective mode of educational delivery while 62(41.3%) viewed contrarily as indicated in Figure 4.11 below.

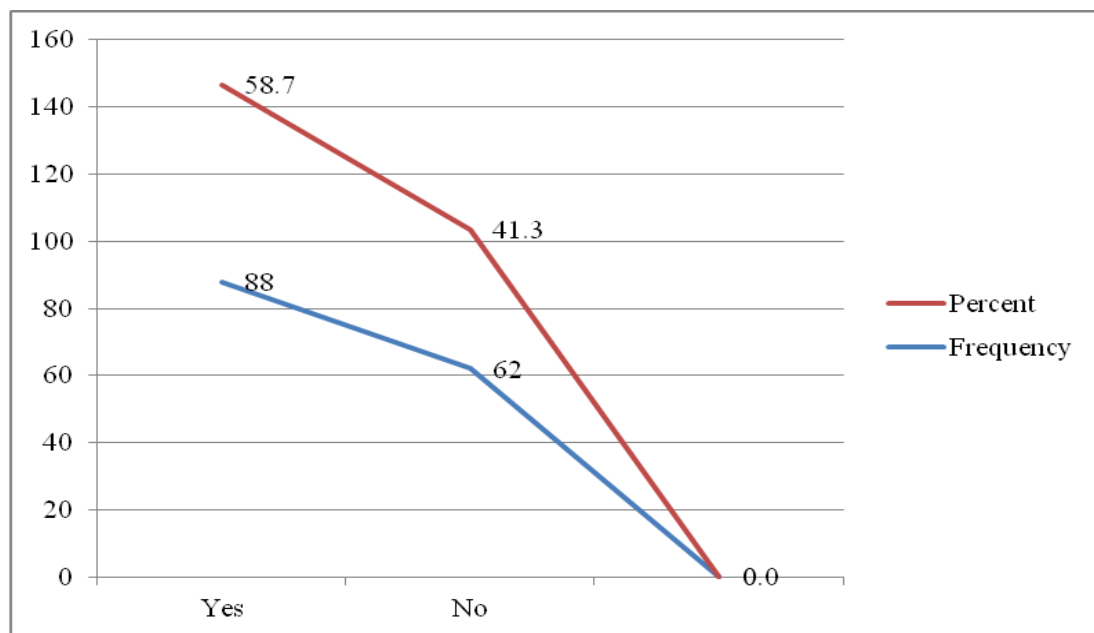


Figure 4.11: Students' Views on the Effectiveness of CD Based Study Materials at OUT

Source: Field data, 2016

The findings from Figure 4.11 imply that majority of students who perceived the use of CD based study materials as being effective in their learning developed positive perception towards CD usage.

4.6 Summary

This chapter has presented and analyzed data collected from students, directors of regional centers, regional record management assistants/regional librarians, and ICT technicians through questionnaires, interviews, focus group discussions and

documentary review. Findings revealed that students had different perceptions regarding the use of CD based study materials. however, majority of students perceived the use of CD based study materials as being beneficial to them because they would give the students the opportunity to acquire new knowledge, enhance their learning experiences, increase their performance and therefore improve the quality of teaching and learning at OUT, while others perceived it negatively because of the challenges associated with the use of CDs including lack of access to computers and inappropriate skills in using computers to access materials. The next chapter presents the summary of the findings, conclusions and recommendations of this study.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusion and pertinent recommendations with respect to the main findings of the study.

5.2 Summary of the Study

This study investigated on students' perception on the use of CD based study materials in the teaching and learning process at OUT. Based on the main objectives of the study, three research questions were drawn up to guide data collection and analysis. These focused on students' perception on the use of CD-based study materials in the teaching and learning process at OUT, students' access to computers as well as students' use of CD based study materials in the learning process. The theoretical framework that underpinned the study was Technology Acceptance Model (TAM) developed by Davis in 1989 with its main constructs being perceived usefulness and perceived ease of use. Theoretical as well as empirical studies relevant to the problem were reviewed for the purpose of providing the researcher with knowledge about the research problem as well as identifying the knowledge gap.

The study was conducted in Tanga, Katavi and Kinondoni regional centres of the OUT and employed both qualitative and quantitative research approaches applying a survey research design. The respondents for the study were 158 including 150 students, 3 directors of regional centres, 3 regional records management assistants

and 2 OUT ICT technicians who were finally reached through purposive and simple convenience sampling techniques. Questionnaire, interview, focus group discussion and documentary review were the main data collection methods used. Data were analyzed through quantitative and qualitative methods. Qualitative data were transcribed and subjected to content analysis and were coded into themes, patterns, and categories. The quantitative data were analyzed with the help of Statistical Package for Social Science (SPSS) software programme version 20 and were summarized and presented through tables and charts of frequencies and percentages.

5.3 Summary of the Main Findings

The following were the main findings of the study:

5.3.1 Students' Perception on the use of CD-Based Study Materials in the Teaching and Learning Process at OUT

- i) The findings of the study revealed that majority of students are aware of the use of CD based study materials in the teaching and learning process at the OUT. High awareness in the use of CD based study materials is attributed to the wide exposure to related information during orientation days and course registration period, being the time when they are inducted on the learning process at OUT. However, awareness is not the only factor even though it is a very strong catalyst that stimulates students to use certain technologies.
- ii) Majority of respondents had positive attitudes towards the use of CD based study materials because of the perceived usefulness associated with

this technology. Most respondents felt confident in using CDs, believed that CD based study materials would help them in understanding things more clearly, admitted that CD based study materials are much more easily accessed than hard copy, agreed that CD based study materials would increase their chances in passing the course and admitted that CD based study materials are easy to carry and store compare to printed materials. Furthermore, they agreed that CD based study materials would help them in improving the quality of teaching and learning at OUT and provide them with an opportunity to acquire new knowledge thus improving learning experience.

- iii) Majority of respondents 96(64%) preferred CD based study materials while 54(36%) did not. Thus, majority are expected to accept the use of CD based study materials in their learning process mainly due to the perceived usefulness of the technology.

5.3.2 Students' Access to Electronic Devices

- i) The findings revealed that a great number of students have access to computers when compared to those who do not. This suggested that many students could be using CD based study materials as a mode of learning.
- ii) On the types of computers owned by students, 91(47.2%) of respondents indicated to possess laptop computers, 60(31%) own desktop computers while 42(21.8%) do not own laptops or desktop computers. This entails that access to computers provided an initial factor in determining

students' perception to use the CD based study materials in the learning process.

- iii) Every sampled regional centre has an ICT laboratory but these are not fully utilized by students because most of the learners are scattered in the districts far away from the regional centers and therefore cannot afford to visit the lab regularly. Furthermore, time also limits students from using the labs as these are open during normal working hours only which is from 8.00 am to 4.00 pm.

5.3.3 Students' Use of CD Based Study Materials in the Learning Process

- i) The findings demonstrated that majority of respondents use CD based study materials in the learning process. This use is associated with students' accessibility to computers and skills of using them.
- ii) Majority of respondents use CD based study materials in the learning process though their extent of use varied. This suggests that some respondents use exclusively or mix with other modes of delivery such as hard copy materials including printed study materials, books and internet search.
- iii) Most students are skilled in using computers while others are not. This difference in students' levels of computer skills influences their perception towards the use of CD based study materials in the learning process. Regarding how learners obtained skills to use computers, self taught was

ranked leading followed by external courses, guidance from OUT ICT technicians, guidance from other students, and through trial and error.

- iv) With regards to the challenges encountered by students when using CD based study materials, the findings revealed that lack of access to computers was ranked as leading followed by inappropriate skills in using electronic devices, scratching of the CDs, unreliable power supply, empty CDs and CDs not durable. This impacts negatively on students' perception towards the use of CD based study materials.
- v) Regarding the effectiveness of CD based study materials, the findings indicated that majority of students agreed that CD based study materials constitutes an effective mode of educational delivery while others opposed the idea.

5.4 Conclusion

The findings reflected in the three research questions and in the field observations by the researcher reveal that majority of students have positive perceptions towards the use of CD based study materials in the teaching and learning process as they believe that this mode of delivery will definitely increase their creativity and interactivity and facilitate new knowledge. Despite this fact, few respondents with negative attitude towards the use of CD based study material may find it difficult to change their mind set from printed materials to softcopy materials due to various emerged challenges involving lack of prior knowledge of interacting with e-learning materials.

The positive attitudes and the willingness of students to use CD based study materials suggest that future e-learning initiatives have great potential in Tanzania in general and at OUT in particular when e-learning technology is given its due significance. The findings of this study serve as a predictor of the attitudes of future students towards e-learning and as a source of information for academics, administrators, researchers and decision-makers involved in planning, designing, implementation and promotion of e-learning in Tanzania.

5.5 Recommendations

On the basis of the research findings and conclusions drawn in the preceding section, the following recommendations are made:

5.5.1 Recommendations for Action

- i) The OUT should embark on the use of both hardcopy materials as well as soft copy materials (CDs) since not all learners have access to electronic devices and are skilled on the use of computers. This will provide support for those students who are in rural areas where there is lack of or unreliable power to still receive the same materials in hardcopy. This way students would be left to choose the best mode of learning.
- ii) The OUT management should assist learners in acquiring computers or laptops by loan or by finding low cost computers to overcome the problem of access of computers to students

- iii) The OUT Directorate of Quality Assurance and Control should thoroughly check out the quality of software and hardware materials prepared for T/L before they are finally delivered for use.
- iv) The OUT management should provide frequent trainings on ICT skills so as to support students with little or no ICT skills. This can be achieved by extending ICT trainings time.

5.5.2 Recommendations for Policy

There is a need of reviewing the existing OUT ICT policy so as to accommodate learners' diversity needs.

5.5.3 Recommendations for Further Research

- i) This study was confined to students' perception on the use of CD based study materials in the teaching and learning process at OUT. There is a need to conduct an investigation on the effectiveness of the use of CD based study materials in the learning process.
- i) This study focused on only three regional centers of the Open University of Tanzania, Kinondoni, Tanga and Katavi. Similar studies should be conducted in other regional centres with reasonable samples so as to make a comparative analysis of other regions for a meaningful generalization.
- ii) The study did not utilize the gender perspective in data analysis. There is a need to correlate men's and women's views on their perception on the use of

CD based study materials in the learning process so as to illuminate differences between men and women using such opportunity.

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APPENDICES

APPENDIX A: QUESTIONNAIRES FOR OUT LEARNERS

Dear participants,

The aim of this research is to measure your perception on the use of soft copy study materials provided to you in CD form (i.e. CD-based study materials) in your learning process. You are among those chosen to participate in this study. The researcher thus, kindly requests you for your sincere input and your willingness to support this work.

The researcher believes that you will find the questionnaires clear and look forward to receiving your responses. All information from you will only be used for the purpose of this study and will be treated confidential.

Thank you very much for participating in this research.

Section A: Demographic

1. Regional centre: Katavi ☐ Kinondoni ☐ Tanga ☐
2. District
3. Age: 21-29 Years ☐ 30-39 Years ☐ 40-49 Years ☐ 50-59 Years ☐ 60 years and above ☐
4. Gender: Male ☐ Female ☐
5. Year of study: First ☐ Second ☐ Third ☐ Fourth ☐ Fifth and above ☐
6. Faculty: FASS ☐ FED ☐ FBM ☐ FLW ☐ FSTES ☐ ICE ☐
7. Educational Background: Diploma ☐ Form Six ☐ Certificate ☐

Section B: Students' Perception towards the Use of CD Based Study Materials

8. Are you aware of the available CD based study materials at your centre?

Yes ☐ No ☐

9. If the answer to question 8 above is Yes, When did you hear about the available CD-based study materials?

During orientation ☐

During course registration ☐

During examination period ☐

During Application ☐

None ☐

10. Have you been using CD based study materials for learning? Yes ☐ No ☐

11. How often do you use CD-based study materials in your learning process?

Never ☐

Rarely (only a few times) ☐

Frequently (twice a week) ☐

Very frequently (many times a week) ☐

12. Apart from CD based study materials, what other means do you use in your learning process? Hardcopy materials ☐

Internet ☐

Softcopy materials ☐

13. How do you perceive the usefulness of CD-based study materials in the T/L process? Good ☐ Bad ☐

14. Please answer all the statements using the scale provided (1-strongly agree to 5-strongly disagree). Provide one response to every question.

		1 Strongly agree	2 Agree	3 Neither agree nor disagree	4 disagree	5 Strongly disagree
1	I develop confidence through using computer and CD-based study materials in my study programme					
2	Using CD-based study materials help me understand things more clearly					
3	CD-based materials are easier to access than hardcopy					
4	Using CD-based study materials increases my chances of passing a course					
5	CD-based study materials are easy to carry and store compared to printed material					
6	CD based study materials help in improving the teaching and learning at OUT					
7	CD based study materials provide opportunity to develop new knowledge and improve learning experience					

15. If you have the opportunity to choose the type of e-learning technologies to deliver course materials in higher education would you prefer CD-based study materials? YES ☐ NO ☐

16. Do you think CD-based study materials is an effective way of learning at OUT
YES ☐ NO ☐

Give reasons

17. Please list three ways in which CD based study materials have improved your academic career

- i)
- ii)
- iii)

Section C: Access to Technology/Electronic Devices

18. 18. Do you have access to electronic device? Yes ☐ No ☐

19. Please indicate the types of technologies you own. Please tick all that apply

Type of technology	No access	No problem with access
Desktop computer		
Laptop computer		
None		

20. Please list three ways in which access to electronic resources has hindered your academic performance

- i)
- ii)
- iii)

Section D: Use of Technology

21. Do you have skills in using computers Yes ☐ No ☐

22. How have you obtained skills in using computers to access materials from the CDs? Tick that which is appropriate to you

i. Through trial and error ☐

ii. Guidance from other students ☐

iii. Guidance from OUT ICT Technicians ☐

iv. Self taught ☐

v. External courses ☐

23. Please indicate the level of your experience in Using computers

	Not skilled at all	Not very skilled	Neutral	Skilled	Very much skilled
Use computer to access materials from the CDs					
Use computer to study notes from various electronic sources					
Use computer to create own notes					

24. Do you feel that the standard of your performance would be low without the use of CD based study materials? YES ☐ NO ☐. Give reasons for your answer

.....

Section F: Challenges Encountered by Students

25. What challenges do you face as a student when using CD based study materials in your learning process? Tick all that apply.

Unreliable power ☐

Lack of access to electronic devices ☐

Inappropriate skills in using electronic devices ☐

Scratching of the CDs ☐

Received empty CDs ☐

CDs not durable ☐

26. 26. What other challenges do you face with the use of CD based materials in your learning process.....

Section G: Other Comments/Recommendation

27. What are your suggestions towards the use of CD based study materials in the learning process?.....

.....

.....

.....

.....

.....

APPENDIX B: INTERVIEW SCHEDULE FOR OUT REGIONAL DIRECTORS

Regional centre_____

Sex: Male_____ **Female**_____

Number of students_____

1. For how long have you been in your present position?
2. Do you have enough CD based study materials for all the courses in your centre?
3. If not what other measures do you use to make sure that your students access the same materials?
4. How do you make your students aware on the availability of CD based study materials at your centre?
5. What is the turn out of students to take CD based study materials at your centre?
6. What is your experience on students' perception on the use of CD based study materials?
7. Do you think your students prefer to learn through the use of CD based study materials? Why?
8. Do your students have essential electronic devices that they use to access materials in accessing materials from the CDs?
9. What type of electronic devices do your students have?
10. Do you think access to electronic devices may affect their acceptance of the use of CD based study materials? Why?

11. Do students use the CDs in their preparation for learning? If not, what other means do they use as a preparation for their learning?
12. Do your students have enough knowledge and skills in using the CD based study materials?
13. What do you do to make sure that all students are knowledgeable and skilled so as to access materials from the CDs?
14. Do you have a computer lab at your centre? How does it help your students in their learning process?
15. What challenges do OUT learners encounter in using CD based study material in the learning process?
16. What are your recommendations towards the use of CD based study materials by OUT students?

Thank you very much for your cooperation.

**APPENDIX B: INTERVIEW SCHEDULE FOR OUT REGIONAL RECORD
MANAGEMENT ASSISTANTS**

Regional centre_____

Sex: Male_____ Female_____

Designation_____

1. For how long have you been in your present position?
2. Have you received any training on computer skills?
3. How many CD based study materials did you receive for this academic year?
4. How many CD based study materials do you have in total in your centre?
5. Do you have enough CD based study materials for all the courses in your Library? If the answer is no what different measures do you use to make sure that students access the same materials?
6. How many CDs have been distributed to students?
7. Do students take the CDs on time?
8. What is the turn out of students to take CD based study materials at your centre?
9. Do you think OUT students prefer to learn through the use of CD based study materials? Why?
10. Do OUT students have essential electronic devices that they can use to access materials in accessing materials from the CDs?
11. What type of electronic devices do the students have?

12. Do you think access to electronic devices may affect students' acceptance of the use of CD based study materials? Why?
13. How do you handle the CDs at your centre?
14. Do students use the CDs in their preparation for learning? If not, what other means do they use as a preparation for their learning?
15. What is your experience on students' perception on the use of CD based study materials?
16. How does the centre help students in using the CD materials?
17. Do OUT students have enough knowledge and skills in using the CD based study materials?
18. What challenges do OUT learners encounter in using CD based study material in the learning process?
19. What are your recommendations towards the use of CDs by OUT students?

Thank you very much for your cooperation.

APPENDIX B: INTERVIEW SCHEDULE FOR OUT ICT TECHNICIANS

Centre_____

Sex: Male_____ Female_____

Designation_____

1. For how long have you been in your present position?
2. Have you been trained on ICT skills?
3. How many CD based study materials have been produced for students?
4. Do all the courses that are offered by the OUT have CDs?
5. Are there enough CD based study materials for all the courses in OUT? If the answer is no what different measures do you use to make sure that students access the same materials?
6. How many CDs have been distributed to students this year?
7. Are the CD based study materials distributed to students on time?
8. Do you think OUT students prefer to learn through the use of CD based study materials? Why?
9. Do OUT students have essential electronic devices that they can use to access materials in accessing materials from the CDs?
10. What type of electronic devices do the students have?
11. Do you think access to electronic devices may affect students' acceptance of the use of CD based study materials? Why?
12. What is your experience on students' perception on the use of CD based study materials?
13. How does the ICT unit help students in using the CD materials?

14. Do OUT students have enough knowledge and skills in using the CD based study materials?
15. What challenges do OUT learners encounter in using CD based study material in the learning process?
16. How do you think the challenges may be solved?
17. What are your recommendations towards the use of CDs by OUT students?

Thank you very much for your cooperation

APPENDIX C: FOCUS GROUP DISCUSSION GUIDE FOR OUT LEARNERS

Regional centre _____

1. Do you use CD based study materials in your learning process? If not what other ways do you use in your learning process?
2. How do you perceive the use of CD based study materials?
3. What factors have motivated you to use CD based study materials?
4. Are you satisfied with the use of CD based study materials? Give reasons.
5. In your own opinions what do you think are the benefits of using CD based study materials?
6. On your own views what are the weaknesses of CD based study materials
7. What challenges do you face with the use of CD based study materials?
8. What measures should be taken to by the OUT management to improve these challenges?
9. In your own views how do you feel about the use of CD based study materials? Why?
10. Do you think OUT students have enough knowledge in using CD based study materials? How?
11. Do you think CD based study materials in an effective way of learning? Why?
12. In your opinion what should be done to promote the use of CD based study materials at OUT
13. In your own view would you recommend your college to use CD based study materials in the learning process? Give reasons
14. Are there any other comments you wish to make on the use of CD based study materials?
15. Is there anything else you would wish to add which you feel we did not cover in this discussion?

Thank you very much for your cooperation.

APPENDIX F: DOCUMENT SEARCH GUIDE

Regional Centre _____

Year	Faculty/Institute	Number of Registered Students	Number of Required CDs	Number of Available CDs	Number of CDs in Shortage
	FASS				
	FED				
	FBM				
	FLW				
	FSTES				
	ICE				

APPENDIX G

THE OPEN UNIVERSITY OF TANZANIA

DIRECTORATE OF RESEARCH, PUBLICATIONS, AND POSTGRADUATE STUDIES



Date: 12/8/2016.

Director of Regional Center,
P.O.Box 5764
Tanga.

RE: RESEARCH CLEARANCE

The Open University of Tanzania was established by an act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No. 55 in the official Gazette. The act was however replaced by the Open University of Tanzania charter of 2005, which became operational on 1st January 2007. In line with the later, the Open University mission is to generate and apply knowledge through research. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you Ms. Hafidha Amrani Khatibu Reg.No. PG201404104 pursuing Master in Open and Distance Learning. We hereby grant this clearance to conduct a research titled “*An Investigation of Students’ Perception on the use of CD-Based Study Materials in the Process of Teaching and Learning at The Open University of Tanzania*”. The research will be conducted in Tanga region. The period which this permission has been granted is from 12/08/ 2016 to 12/10/2016.

Incase you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O. Box 23409, Dar es Salaam. Tel: 022-2-2668820. We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,

Prof Hossea Rwegoshora
For: VICE CHANCELLOR
THE OPEN UNIVERSITY OF TANZANIA